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AMERICAN JOURNAL OF OPHTHALMOLOGY

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No. 7

PRIMARY RING SARCOMA OF THE IRIS.

T. M. LI, M.D.

PEKING, CHINA.

In the case here reported, impairment of vision recently noticed led to discovery of a growth in the iris, increased intraocular tension and greatly contracted field of vision. The enucleated eye showed ring sarcoma of the iris invading the ciliary body. Previously reported cases of ring sarcoma of the iris and ciliary body are discussed. Read before the New England Ophthalmological Society, January 16, 1923.

Tumor of the iris is a very rare disease of the eye. Among the total number, 457,141, of ophthalmic patients treated in the Out Patient Department of the Massachusetts Charitable Eye and Ear Infirmary during the past twenty-three years (from 1900 to 1922), there were 154 cases of tumor of the uveal tract examined microscopically, of which only six were cases of tumor of the iris, namely: one case each of mesoblastic leiomyoma, metastatic carcinoma, angioma, cholesteatoma (pearl cyst), melanotic ring sarcoma (present case), and one of probable epiblastic leiomyoma. During the same period of time, there were 140 cases of sarcoma, 3 cases of angioma, and 5 cases of metastatic carcinoma of the choroid examined.

A ring sarcoma of the iris may be defined as a sarcoma of the iris in which the tumor extends thruout the entire circumference or the iris root and the filtration angle, forming a complete ring around it. Ring sarcoma of the ciliary body is a sarcoma which extends thruout the whole circuit of the ciliary body forming a complete ring within it.

In the literature on sarcoma of the uvea, ring sarcoma is especially rare. In fact, I have been able to find only five cases of ring sarcoma of the iris, and five cases of ring sarcoma of the ciliary body. The following typical case of ring sarcoma of the iris is, therefore, of unusual interest:

CASE: M. M., male, age 22, a farmer by occupation, was admitted to the service of Dr. F. H. Verhoeff, Feb. 13, 1922, at the Massachusetts Charitable Eye and

Ear Infirmary. The patient stated that for a month he had noticed blurring of vision in his right eye, and that this eye had been "blood shot" on several occasions. Also that during this time he had observed several dark spots on the iris. He had never felt pain in the eye. He never had any trouble with his eyes, except that two years ago, his right eye was "struck by a piece of steel." Immediately following the accident, his physician "took the steel out" and prescribed a wash for him to use at home. Patient was in good health; his family history was negative.

On account of the questionable presence of a foreign body in the eye, an X-ray examination was made, but with negative result. On examination, a small darkly pigmented growth was seen in the upper outer quadrant of the ciliary portion of the iris. This had never been observed by the patient. It was somewhat triangular in outline with its base covering nearly the entire upper outer quadrant of the periphery of the iris. (Fig. 1.) The rest of the iris was normal in color, being light blue with fine brownish radiations. Scattered over the surface of the iris there were several darkly pigmented spots.

On Feb. 19, 1922, Dr. Verhoeff examined the patient. Ocular tension O. D. = 55 mm., O. S. = 20 mm. Field of vision O. D. as tested with a 5 mm. disc was greatly contracted above and on the nasal side. V. O. D. = 20/40, O. S. = 20/15. The ophthalmoscopic examination revealed a deep glaucomatous cupping of the right disc, with an otherwise

normal fundus; the left fundus was normal. A diagnosis of sarcoma of the iris, probably of ring form, was made by Dr. Verhoeff, and enucleation was advised. This was refused. Patient later consulted Dr. E. Hurley as a private patient, and was referred by him to Dr. Verhoeff for consultation, who again advised enucleation. This was performed by Dr. Hurley on March 22, 1922, and the globe was sent to Dr. Verhoeff for examination.

On September 19, 1922, almost six months after the enucleation, patient was asked to return for examination. O. D. = socket good, conjunctiva normal in color, no evidence of recurrence. O. S. = normal.

PATHOLOGIC EXAMINATION.

(4412) *Macroscopic Examination.*—The eye was fixed in 10% formalin and subsequently treated with acid alcohol. The eyeball is practically normal in shape and size. The cornea is horizontally oval, and free from obvious opacities. The anterior chamber measures about 4 mm. in depth. There is no anterior peripheral synechia. In fact the filtration angle is everywhere abnormally wide, but at the upper outer quadrant it is filled in by the tumor. The iris is in situ, and its pupillary margin regular and free.

Projecting from the iris at the angle in the upper outer quadrant, a brownish black triangular shaped tumor is seen. The base of this main tumor along the root of the iris is about 7 mm. in extent. It fills the angle of the anterior chamber, and is in close contact with the inner surface of the cornea for a distance of 2.25 mm. The apex of the tumor is directed toward the pupil and reaches almost midway between the ciliary and pupillary zones of the iris. The rest of the iris appears normal, except that scattered on its surface there are about nine slightly elevated pigmented nodules. The largest is about 0.09 mm. in diameter. Continuing from the main tumor is a narrow darkly pigmented ring (Fig. 1) extending around the remaining circumference of the filtration angle. The lens as far as can be determined macroscopically is normal. The pupillary margin seems to be free from any ad-

hesion and there is no exudate within the pupillary area. The choroid and the retina are in situ. The vitreous is normal. The optic nerve shows deep cupping.

MICROSCOPIC EXAMINATION.—Meridional sections thru the main tumor and numerous sections thru other parts of the circumference of the iris were made, some of them serially. Longitudinal sections were made of the optic nerve until the central vessels were nearly reached; then the remainder of the nerve was cut in serial cross sections.



Fig. 1.—Diagram showing appearance of tumor and iris, as seen by looking into the anterior chamber after opening the globe.

The main tumor is 1.5 mm. high by 2.75 mm. long. It replaces the anterior portion of the ciliary body and involves the anterior portion of the iris for a distance of about 1.8 mm. The largest portion of the tumor, therefore, projects into the anterior chamber (Fig. 2). It is composed of spindle cells, closely packed together and arranged in bundles running in various directions. Between the bundles as well as between the cells there is no connective tissue stroma found. The nuclei of the cells appear round or oval according to the way they are cut. The tumor cells have a great tendency to arrange themselves radially to the blood vessels, which are fairly numerous and consist of spaces lined by endothelium. Upon these vessels the tumor cells abut without any intermediary tissue.

The tumor in general is moderately pigmented but shows here and there large areas of intense pigmentation. Along the blood spaces the pigment cells are specially numerous, being round and irregular in shape, and the individual cells densely packed with pigment. The pigment is autochthonous, as shown by the fact that it is readily bleached by potassium permanganat followed by oxalic acid. In bleached specimen, these dense-

ly pigmented cells do not show the fine reticulum generally seen in endothelial phagocytes; so that they are probably tumor cells. No typical branching chromatophores are encountered anywhere within the tumor. The tumor is everywhere free from necrosis or hemorrhage. No mitotic figures can be detected in the sections examined.

Filtration Angle.—The ligamentum pectinatum beneath the main tumor is replaced by tumor cells and the canal of Schlemm cannot be recognized. The tumor, where it is in contact with the

from the main tumor down to the pigment epithelium at the pupillary margin. The layer is intensely pigmented, especially in places. Near the tumor it is about nine or ten cells deep, but gradually reduces to three or four toward the margin of the pupil. Other sections show the layer thin with breaks in continuity. Beneath the areas that are most intensely pigmented, there is marked increase of stroma cells. In these areas the tumor cells have a tendency to invade irregularly the iris stroma and to intermingle with the stroma cells.

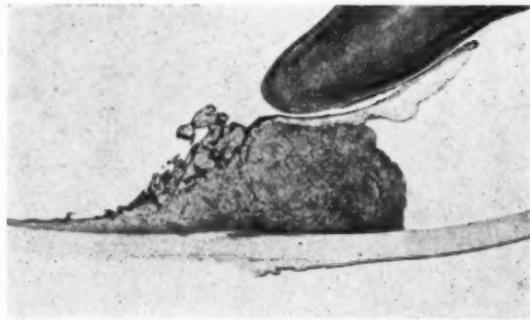


Fig. 2.—Anteroposterior meridional section passing thru the middle of the main tumor. Hematoxylin and eosin. Photo x 11.

cornea, has destroyed its endothelium, but has left Descemet's membrane intact. This membrane is separated from the corneal stroma for a short distance from the angle of the anterior chamber by an insinuation of tumor cells. In the vicinity of the filtration angle the corneal stroma and the scleral tissue are slightly invaded. There is slight perivascular extension around many of the blood vessels in this region.

Iris.—The entire upper third of the iris, where the main tumor is located, is extensively involved by the tumor, but between the tumor and the pigment epithelium of the iris there is a narrow strip of the iris stroma which is comparatively normal (Fig. 2). This extends upward and gradually disappears within the new growth. The stroma of the lower two-thirds of the iris is practically normal, except for the part adjacent to the tumor, which shows a marked increase in stroma cells. Some sections show the anterior boundary layer of the iris replaced by a continuous layer of tumor cells, which extends

Pigment layer of the iris.—Thruout its entire extent, on the side of the main tumor, the pigment layer of the iris does not seem to be altered, but is adherent to the anterior capsule of the lens over a wide area. There is slight, if any, ectropium uveae. The dilatator fibers and the sphincter pupillae are normal. The blood vessels of the iris are normal.

Sections away from the main tumor.—These sections all show marked involvement of the filtration angle and differ merely in degree of invasion of the structure of the iris.

Filtration angle.—In the sections where the involvement is greatest away from the main tumor, the canal of Schlemm and the meshes of the filtration angle are densely packed with tumor cells. From the ligament the tumor cells extend about 0.6 mm. down into the iris stroma, and also extend as a layer five to sixteen cells deep along the surface of the iris for a distance of about 2 mm. The pigment cells are irregularly oval, round, or spindle shaped. Along the margin of the filtration angle, the spindle

shaped cells predominate and their long axes are almost vertical to the surface. In the sections where the involvement is least, the canal of Schlemm and the spaces of Fontana can easily be recognized, but are also densely packed with darkly pigmented tumor cells (Fig. 3). The surface of the ligament is coated with an uneven layer of cells (Fig. 3). The pigment cells here are similar to those in the section just described, but at the margin of the filtration angle the spindle cells are arranged more or less parallel to the surface.

Iris.—As already noted, in the sections away from the main tumor in which the

mented spindle cells at the pupillary margin surface of the iris in another section, there is a small ring of pigment cells which encloses tissue resembling normal iris stroma. There is no blood vessel within the ring (Fig. 5).

Ciliary body.—The ciliary body at the site of the main tumor is extensively involved. The anterior portion of the muscle of Brücke is replaced by tumor cells, but its posterior fibers appear unaffected. The radial fibers are extensively invaded, but some of the posterior radial fibers can be recognized, being merely separated by the sarcoma cells. Mueller's circular fibers are entirely re-

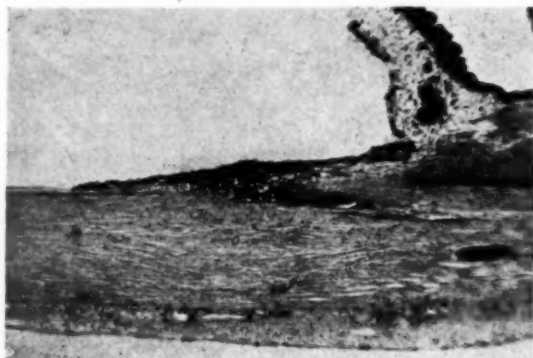


Fig. 3. Filtration angle on the opposite side where it is least involved. There is a focus of pigmented tumor cells in the iris stroma. Hematoxylin and eosin. Photo x 45.

filtration angle is most involved, the growth continues from the angle over the surface of the iris for a distance of about 2 mm. In the sections in which the filtration angle is least involved, there is no extension over the surface of the iris. Scattered over the iris are found a number of isolated areas involving the anterior portion of its stroma. The largest one measures about 1.3 mm., and the smallest 0.12 mm. in greatest diameter. None of the sections examined is free from at least one of these areas. Between these areas the spindle cells of the anterior boundary layer are in general markedly increased in number, and show somewhat increased pigmentation. In one of the sections examined, an irregular nodule of tumor cells is seen extending from the surface thru almost one-half the thickness of the iris (Fig. 4). The stroma cells around this nodule are increased in number.

Projecting from a layer of deeply pig-

placed by the tumor. All the ciliary processes, with the exception of a few short ones adjoining the pars plana, are filled with tumor cells. The pigment layer as well as the ciliary epithelium over the main tumor are broken thru in places, the tumor cells filling the valleys between the ciliary processes. At the advancing margin of the tumor in the ciliary body, large irregularly shaped, deeply pigmented cells are especially abundant.

In sections away from the tumor, the ciliary body is normal and uninvolved by the tumor, except at the attachment of the ciliary muscle to the ligament, where the tumor cells have extended slightly from the ligament into it.

Cornea.—In one of the sections the cornea shows a small, old superficial scar, evidently produced by a foreign body. Elsewhere it is normal, except at the periphery where it is slightly involved by the tumor as has already been described.

Anterior chamber.—It is free from blood and exudate.

Lens.—The lens capsule is intact. A few sections show beginning cataractous changes in the cortex at the periphery of the lens.

Choroid.—The choroid is heavily pigmented, but is normal.

Retina.—The retina is congested, but shows no marked edema. The ganglion cells are well preserved in the macular region, but are greatly diminished in number towards the periphery of the retina.

chamber and advanced glaucoma. The duration of the tumor is impossible to determine. The patient noticed blurring of vision for a little over two months previous to the time the eye was enucleated but had never observed the main tumor of the iris. The darkly pigmented spots on the surface of the iris represented the microscopic nodules seen in the sections. Such nodules were also observed by Solomon,¹ Hanke,² Werner,³ Bergmeister,¹⁰ Alt,³ Levan,⁴ and Pindikowski⁵ in their own cases. The microscopic ring shaped body seen near the pupillary

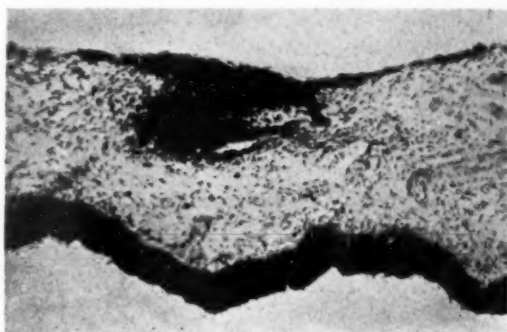


Fig. 4. Nodule of densely pigmented tumor cells on surface of iris, invading iris stroma. Hematoxylin and eosin. Photo $\times 55$.

Optic nerve.—The optic nerve shows deep glaucomatous cupping with a large area of cavernous atrophy somewhat eccentrically placed, beneath the lamina cribrosa. The rest of the nerve shows the gliosis usually seen in glaucomatous conditions. One section shows three typical corpora amylacea within the area of cavernous atrophy. The central vessels, studied in serial cross sections, both show moderate endovasculitis. The artery shows a dissecting aneurism with the formation of an inner tube, but the lumen of neither vessel is greatly reduced in size. The whole of the nerve in the optic canal is intensely congested.

REMARKS.

This case is one of typical primary ring sarcoma of the iris, with extension into the anterior portion of the ciliary body at the site of the main tumor, and extension around the entire circumference of the filtration angle. The ring formation was suspected clinically by Dr. Verhoeff owing to the deep anterior

margin in the present case (Fig. 5) was similar to the small body noted by Werner in his case of ring sarcoma of the ciliary body. It differed, however, in containing no definite blood vessel. Regarding the origin of these apparently isolated nodules of pigment cells, it is difficult to ascertain whether they were due to a direct extension of the tumor, to metastasis thru the aqueous or to localized proliferation of cells of the anterior boundary layer of the iris.

The glaucoma in this case was clearly due to obstruction of the filtration angle by the extension of the tumor thruout the whole circumference of the ligamentum pectinatum. It is interesting to note that in this case, just as in buphthalmos, where there is also obstruction to the outflow of aqueous, there was no anterior peripheral synechia and the anterior chamber was deep.

In the cases in the literature of both ring sarcoma of the iris and ring sarcoma of the ciliary body, the condition of the filtration angle is too inadequately de-

scribed for any conclusion to be drawn as to whether or not the condition was essentially the same as in the present case. In three cases (Hanke,² Kopetzky v. Rechtperg,⁷ and Parsons⁸) the root of the iris was drawn forward in places, but was separated from the ligament and cornea by tumor cells.

In the five cases of ring sarcoma of the iris, there was definite cupping of the optic disc in four cases (Hanke, Alt, Levan, and Pindikowski) and no evidence of glaucoma in the other (Solomon).

In Alt's case a spot was noticed on the iris for several years by the patient. It did not give the patient any trouble until about three weeks before consultation, when pain was felt in the eye. The speck apparently developed into a triangular shaped protrusion in the iris. The vision became reduced to 20/70. Altho pain was felt only three weeks before the patient was seen, the tumor must have existed for several years, as apparently the main tumor was developed from the spot on the iris which was observed by the patient.

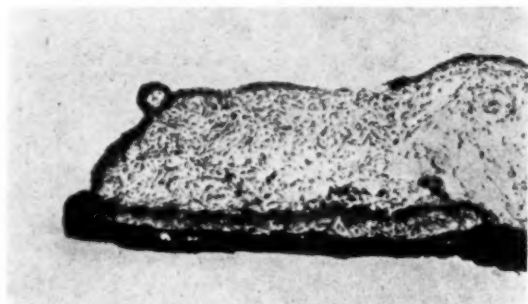


Fig. 5.—Peculiar ring formation on surface of the iris. Hematoxylin and eosin. Photo X65.

In regard to the duration of these tumors, altho no definite conclusion can be drawn, yet a fair knowledge of the length of existence can be obtained, first by noting the time the speck was observed until the time it became a definite tumor, and secondly, by observing the duration of the failing vision which gave some clue as to the duration of the greatest activity of the tumor.

In Solomon's case a speck on the iris had been observed by the patient for twenty years. It gradually increased in size and became a tumor. The failure of vision was apparently gradual and in proportion to the increase in size of the tumor. The vision was 20/100 at the time the eye was removed. The duration of this tumor was probably of twenty years or more.

Hanke's case gave a history of failing vision for nine months. The vision became practically nil. The duration of the greatest activity of the tumor in this case, as judged by the impairment of vision, was therefore at least nine months and the existence of the growth no doubt considerably longer.

In Levan's case a pigmented nevus was observed (probably by the patient's parents) for several years. A year before the eye was removed, it began to increase in size, and several pigmented spots were observed on the iris which were not noted previously. These spots were no doubt secondary growths. The vision was 5/8. This tumor was without question several years in duration.

In Pindikowski's case the tumor had been noted for some time by the patient, but the failing vision was noticed only for a few weeks. At the time of first operation, the vision was 5/10 with correcting lenses. The tumor was removed by iridectomy in pieces and incompletely. One year later recurrence occurred and the eye was enucleated. The duration of this tumor was no doubt over a year.

It is interesting to note that all the five cases of ring sarcoma of the iris found in the literature occurred in women, while the present case occurred in a man. Their ages varied from 12 to 63. In all but one case (Pindikowski) the right was the affected eye. In two

cases the tumor was found at the lower portion of the iris, one at the outer portion, and in the other two the location was not mentioned. In all five cases the root of the iris was ultimately involved. In the present case the tumor was in the upper outer quadrant of the iris. In three cases (Solomon, Alt, and Levan) the tumor cells were spindle cells. In Solomon's case besides the spindle cells there were also roundish, globular, and caudate cells. In Hanke's case the cells were described as being polygonal but some spindle cells were also noted. He thought he could trace the origin of the tumor from the endothelium of the meshwork of the ligamentum pectinatum.* In four cases the tumors were pigmented. In Pindikowski's case the tumor was observed clinically as a dark brown tumor, but microscopically pigmentation was not described. The present tumor was moderately pigmented; the cells were spindle shaped with no intercellular tissue.

Of the five cases of ring sarcoma of the ciliary body, there were two cases (Kopetzky v. Rechtperg, and Werner) in which an annular formation of the tumor cells around the filtration angle was recorded. Kopetzky v. Rechtperg diagnosed his case "Ringformiges Sarkom der Iris und des Ciliarkörpers," but in the text of his report this ring formation of the tumor was not definitely described. Werner diagnosed his case as one of ring sarcoma of the uveal tract originating close to the angle of the anterior chamber. According to his report, even in the least involved section examined, the canal of Schlemm and the meshes of the filtration angle were packed with pig-

*The mere fact that Hanke could apparently trace transition of cells from the ligamentum pectinatum into tumor cells is, in Dr. Verhoeff's opinion entirely insufficient evidence that the tumor had its origin from this structure. The tumor was of considerable size and if it had started in the ligamentum pectinatum, its origin from this structure could no longer have been detected. Even if the tumor had this origin it would not be an endothelioma, because these cells are not truly endothelial. The fact that the tumor was similar in structure to many sarcomata of the choroid seems sufficient evidence that it was an ordinary sarcoma.

mented cells, indicating that there was a ring sarcoma in the filtration angle.

The present case resembled very much that of Werner, except that in the latter's case there was in addition a ring formation of the tumor within the ciliary body. The points of resemblance are: the general history, the type of cells and the mode of arrangement (interlacing bundles) of these cells, the pigmentation and the arrangement of the pigment cells at the margin of the filtration angle, the deep anterior chamber and the condition of the angle, the invasion of the anterior boundary layer of the iris, the small nodules of tumor cells in the iris stroma, and the ring of pigment cells found on the surface of the iris near the pupillary margin.

Among the five cases of ring sarcoma of the ciliary body, there was glaucomatous cupping of the disc in four (Ewetzky, Kopetzky v. Rechtperg, Parsons, and Werner) and no cupping in one (Bergmeister). The duration of these tumors of the ciliary body was even more difficult to determine than that of the ring sarcomata of the iris, because a tumor of the ciliary body may exist for a long time and become of large size before it causes any symptoms.

In Ewetzky's case a black speck on the iris, which later developed into a brownish tumor, was observed by the patient for seven years previous to the time of consultation. Three years later the tumor filled in one-fourth the anterior chamber. It was then excised. Two years after the excision there was no recurrence. But nine years later, the eye was enucleated for glaucoma. The tumor was therefore at least twenty-one years in duration.

Kopetzky v. Rechtperg's tumor was at least twelve years in duration. At the time the patient was first seen the failing vision was of five months standing. The vision was c.-2, 5/10. An operation (sclerotomy?) was done with no improvement. Later two iridectomies with an interval of one month were done. Nine years later the eye was enucleated for pain.

Parsons' patient gave a history of traumatism of the eye four years previously. The filtration angle was not described

and the vision not given. There was deep cupping of the disc. Altho nothing definite could be said regarding the duration, yet on account of the deep cupping of the disc the tumor had probably existed for a number of years.

Werner's patient gave a history of gradual failing vision for nine months. Black spots on the iris were noted by the patient also for nine months. These gradually increased in size. The vision was "hand movements, close up." This case was probably of a year or more in duration. The filtration angle was early involved thruout its entire circumference causing an early rise of intraocular tension.

In Bergmeister's case the tumor was seen in the anterior chamber five months before removal of the eye. The vision was 6/36 at the time of operation.

Three cases occurred in men, one in a woman, and in the other, the sex was not mentioned. With the exception of Bergmeister's case, in which the patient was 61 years of age, all the ring sarcomata of the ciliary body occurred in young adults; the ages being 14, 18, 20 1/2, 39, and 61 years.

The tumor cells in these cases were chiefly spindle shaped, but in Kopetzky v. Rechtperg's case oval and round cells were also found. In Parsons' case the tumor was leucosarcoma; the other tumors were all melanotic.

Ring sarcoma of the iris and diffuse sarcoma of the choroid are similar, but differ in certain particulars. They are similar in that both diffuse into the surrounding tissue. They differ in that the iris tumor begins as a circumscribed tumor and tends to grow upon surfaces. The absence of a tendency for diffuse sarcoma to grow upon surfaces may be apparent only, and due to the fact that it is confined within the choroid by the membrane of Bruch. The other difference between the two tumors may also be simply apparent, due to the fact that the diffuse sarcoma is observed at a later stage.

Regarding the question of malignancy, these two types of tumor are so similar that it would naturally be assumed that they are of equal malignancy. Unfortunately, however, there does not seem to be any statistics which throw much

light on the malignancy of diffuse sarcoma of the choroid. The frequency with which epibulbar nodules occur suggests a high malignancy for this tumor, but of course does not necessarily prove it. The occurrence of epibulbar nodules in two of the five cases of ring sarcoma of the iris (Hanke and Pindikowski) is equally suggestive, considering the relatively small size of the tumors.

In conclusion I wish to express my gratitude to Dr. F. H. Verhoeff, my teacher and friend, for his permission to report this case and to use his sections for study. I am also indebted to him for his kind help and invaluable suggestions which made it possible for me to present the case.

ABSTRACTS OF CASES.

The following are abstracts of the cases of ring sarcoma of the uvea reported in the literature:

Ring sarcoma of the iris.—Solomon¹. Female, age 43. Patient first noticed a small speck the size of a pinhead in the outer ciliary margin of the iris O. D., about 20 years ago. Since then the tumor had gradually increased in size, growing toward the pupillary margin of the iris and overlapping it slightly. Of late, occasional darting pain in the eye. Tumor was brown in color. External surface of the eye normal. Cornea clear. Anterior chamber shallow. Lens clear. Vitreous cloudy. Vision = 20/100. Enucleation. Specimen examined by Priestley Smith. Viewing thru the cornea, there was a small black elevated mass about 2 mm. wide extending from the pupillary margin apparently to the base of the iris. Cells closely packed, some densely pigmented and some unpigmented. Cells: Spindle cells were closely packed; roundish, caudate or globular cells were more loosely distributed. Tumor was freely traversed by blood vessels. Secondary deposits of melanotic cells in many places on the surface of the iris. Angle of the anterior chamber infiltrated thruout by a mass of cells, which had no direct continuity with the primary growth. The cells were evidently brought there by the aqueous. In some sections the sclera was invaded. Cells infiltrated freely into the muscular fasciculi of the anterior limit of the

ciliary muscle. Ciliary processes were not involved. The angle of the anterior chamber was not closed. Optic disc showed no signs of having been subjected to an excess of pressure.

Hanke.²—Female, age 63. O. D. vision failing 9 months. Had light perception. Pain 2 months. In lower nasal quadrant there was projected a dark tumor. Anterior chamber very shallow. Posterior synechiae. Tension + 1. Vision nil. Pathologic examination: Neoplastic cell proliferation in entire circumference of the filtration angle. Main tumor was triangular in shape and began in front of the ciliary muscle. Iris root was free in places; in places where it was adherent to the cornea iris was separated from it by tumor cells. Cells were generally polygonal, some spindle shaped. They were pigmented and often resembled chromatophores of the choroid. In some places deeply pigmented masses were seen. Isolated giant cells seen. Tumor invaded ligamentum pectinatum and perivascular lymph spaces. Tumor sharply defined. A sharply defined nodule in episcleral tissue, also secondary tumor nodules in iris, even in sphincter pupillae. A few precipitates of tumor cells on back of cornea. Shallow glaucomatous cupping. Retina and choroid normal. Hanke thought he could trace tumor from proliferation of endothelium in the meshwork of ligamentum pectinatum; also thought it was a case of primary glaucoma.

Alt.³—Female, age 49. Pain and impairment of vision O. D. Vision = 20/70. A spot on the iris noticed for several years, but patient paid no attention to it because it did not trouble her. Of late the vision was impaired. The pain, at the time of consultation, came on three weeks previously. Anterior chamber shallow in its lower third. Pupil small and immobile downward, due to a triangular shaped protrusion there. Another slightly raised spot in the upper outer quadrant, close to the periphery. Tension increased. Disc slightly cupped. Macroscopically, the entire periphery of the iris was thickened with the growth, most pronounced at the lower third. Tumor started from the ciliary body and reached forward to the pupil. Microscopically, the lower anterior chamber

was obliterated. Iris here was much altered. Several microscopic tumors seen in the surface layer of the iris, which were not noted clinically. The growth was not confined to the two protruding portions of the iris as seen clinically, but the whole periphery of the iris was thickened by a ring formation of the tumor. In some sections the tumor cells reached back into the anterior portion of the ciliary body and appeared as if they were growing peripherally into the ciliary body. At the location of the ligamentum pectinatum and the canal of Schlemm the tumor elements had entered the sclerotic. Near the pupillary margin the tumor broke thru into the posterior chamber, and was in contact with the pigment layer of the posterior surface of the iris which was not destroyed. The origin of the tumor was not definitely determined. The optic nerve showed the usual glaucomatous changes.

Levan.⁴—Female, age 12. In lower outer quadrant O. D. a pigmented nevus was observed for several years. Increased in size during the past year. Tension = 35 mm. Vision = 5/8. Iris showed several pigmented spots, which were not present previously. No metastasis one and a half years after increase growth was noted. At site of tumor entire iris replaced by tumor cells except the pupillary margin. Tumor sharply defined from ciliary body. Optic nerve showed a flat excavation. Tumor slightly pigmented and showed numerous large spaces lined by tumor cells and containing homogeneous (coagulum) substance. Pigment did not give iron reaction. Spindle cells. In anterior layer of iris there were small collections of pigment cells not in relation with tumor. In several sections, however, small strands of pigmented cells extended from these nodules toward the iris root. At iris root there was, more or less, a heaping up of cells similar to those of the tumor; these formed a ring in the region of the iris root. Schlemm's canal and neighboring vessels filled with tumor cells. Upon posterior surface of the cornea there were found a few isolated or congregated round pigment cells.

Pindikowski.⁵—Female, age 39. Nine years previously sight O. D. reduced to

"fingers" by obstruction of a branch of central vein. Irides O. U. showed small pigmented spots. During the past few weeks sight O. S. diminished and eye painful. Vision = 5/15; c. cyl. — 1.50 ax. 5° = 5/10. Tension = 60 mm. A fairly large dark speck had been noticed by patient for some time; iris showed below and near the ciliary border a dark brown tumor. Chronic inflammatory glaucoma. April, 1912: Tumor removed, by iridectomy, in pieces and incompletely. April, 1913: Recurrence in eye. Enucleation. Tumor found in iris, distinct nodule in episclera at site of wound, infiltration of tumor cells into ciliary body, ring formation of tumor at root of iris, and tumor nodules on surface of iris. In places the tumor grew as a layer over the anterior surface and over the pigmented layer of the iris. Tumor cells grew along zonular fibers and on surface of lens. Anterior peripheral synechia not described, apparently absent from picture. Tumor cells filled spaces of Fontana.

Ring sarcoma of the ciliary body.—Ewetzky.⁶—Female, age 39. Admitted 1895. In 1881 Prof. Kruków found O. D. in the upper outer quadrant of the iris, a brownish yellow tumor which had been developing for 7 years from a black speck, according to the patient. In 1884 it filled one-fourth the anterior chamber covering half the pupil. The tumor then was excised and found to consist of melanotic spindle cell sarcoma. In 1886 no recurrence was found. In 1895 glaucoma developed. Enucleation performed. Tumor existed as a typical ring sarcoma of the ciliary body which had continued into the iris, replacing its structure. Spindle cells slightly pigmented. Anterior chamber normal in depth. No description of the filtration angle or the posterior part of globe was made.

Kopetzky v. Rechtperg.⁷—Male, age 20 1/2. Total duration of tumor was at least 12 years. Failing vision 5 months. Recently pain. Operated upon one and a half months after onset of blurred vision (sclerotomy?). No improvement, no congestion. Anterior chamber normal in depth. Iris normal except that in the lower outer quadrant there were a number of brownish spots of various

sizes. There was also ectropion uveae here, and this part of the iris failed to react to light. Tension + 1. V. O. D. = c — 2, 5/10. Disc deeply cupped. Iridectomy upward, and one month later iridectomy downward, were done. Nine years later enucleation for pain. All parts of iris and anterior part of ciliary body were invaded by sarcoma cells. The cells were chiefly spindle shaped. Filtration angle: Anterior synechiae by intermediary of tumor cells. Rust brown pigment cells around blood vessels of iris. Surface of iris showed continuous layer of sarcoma cells (very few pigment cells). Tumor involved filtration angle and grew under Descemet's membrane. Also followed vessels. Ciliary body involved all around, also ciliary processes and neighboring ciliary muscles (meridional muscle fibers not involved). Ciliary body was somewhat enlarged but form not altered. Disc deeply cupped. Equatorial staphyloma of sclera. Between spindle cells fairly numerous round and oval pigment cells were found.

Parsons.⁸—Boy, age 14. O. S. hit by a football 4 years previously. Deep anterior chamber. Large intercalary staphyloma above. Sections of this case (in Dr. Verhoeff's laboratory) show that the iris forms part of intercalary staphyloma, then was adherent to cornea by intermediary of sarcoma cells. Below, entire ciliary body replaced by tumor cells; tumor cells invaded iris as far as the pupillary margin. Marked ectropion uveae covering invaded iris. Disc deeply cupped. On other side ciliary body also was invaded but less extensively. Leucosarcoma. Filtration angle elsewhere not described and apparently not sectioned.

Werner.⁹—Male, age 18. Failing vision O. D. 9 months. Black spots on right iris noticed by patient 9 months ago. Vision gradually became worse as size of spots increased. Never had inflammation or pain in the eye before. Pupil circular and free but larger than that of O. S. V. O. D. = hand movements, close up. Tension + 1. Deep cupping of disc.

Iris darkly pigmented and was almost completely covered by coal-black patches of pigment of various shapes and sizes. Patches did not reach pupillary margin

except at the lower inner quadrant. Most of them were confluent but some isolated. Outside and slightly below the horizontal meridian there was a dark brown mass, its free convex surface wedged into the angle of the anterior chamber and flattened against the cornea. Vertically it measured $3/4$ mm. and projected very little beyond the corneal margin into the anterior chamber. Smallest pigmented spot was found in the upper outer part of the iris, and was least pigmented. Unpigmented parts of the iris were paler and greyer than the iris of the sound eye. Macroscopically, the tumor was triangular in shape with its apex at the origin of the ciliary body and its base toward the anterior chamber. Microscopically, a flat band of tumor cells in the surface of the iris. Opposite the largest part of the tumor the iris was displaced backward, and its posterior surface bent at right angles over the tumor. Pigment layer of the iris was separated from the tumor by a layer of normal iris tissue. Descemet's membrane over surface of the tumor was altered. Ligamentum pectinatum was more or less absorbed, the fibers being compressed and the meshes filled with pigment cells. Tumor was entirely cellular, cells were closely packed with no intercellular substance. In the main tumor they were spindle shaped and arranged themselves in interlacing bundles. Tumor was moderately pigmented. Iris tissue beneath the pigment epithelium as a rule was normal. Near the main tumor the cells invaded the deeper part of the iris stroma and extended down into some of the crypts. Two kinds of microscopic tumors were observed, namely, a ring form near the pupillary margin enclosing normal iris tissue with one or more blood vessels within it; and another form found near the angle of the anterior chamber consisting of localized proliferation of the pigment cells on the surface of the iris. Some hyalin changes of blood vessels of the iris in the upper outer quadrant. Anterior chamber, away from the main tumor, was rounded off, deeper than normal and in most cases

lined by a single layer of deeply pigmented cells placed at right angles to the surface. Pigment cells extended from the commencement of the ligamentum pectinatum, around the angle of the anterior chamber, and onto the surface of the iris for a distance of about 1 mm. The ciliary body was affected thruout its entire circuit, except in the region of the large tumor, where changes were limited to an area close to the angle of the anterior chamber, between the origin of the muscle and the ligamentum pectinatum in front, and the root of the iris and commencement of the ciliary processes behind. As a rule the ciliary body was not involved farther back than the point where the ciliary processes began, except opposite some parts of the tumor in the angle of the anterior chamber. Even in the least involved sections, the canal of Schlemm and meshes of the ligamentum pectinatum were packed with pigmented cells. Some perivascular lymph spaces at the corneosclera were involved. Tumor never reached as far as to the choroid. The ring like infiltration consisted partly of unpigmented endothelial cells. There was no sign of inflammation, except at the center of the pigmented area, where there were evidences of degeneration and necrosis. The origin of the tumor was not determined.

Bergmeister.¹⁰—Patient age 61. Sex not stated. Tumor O. S. seen 5 months before removal. Vision = $6/36$. Anterior chamber normal in depth. Tension normal. Incipient posterior cortical cataract. No cupping of disc. Tumor involved ciliary body all around and grew over posterior cornea for a short distance; also involved filtration angle, but not completely all around. Isolated flat nodules on surface of iris. Small nodules with mitoses seen. Main tumor chiefly consisted of spindle cells. Cells melanotic and radial to blood vessels. Numerous mitoses found. Tumor primary in ciliary body. Disc not cupped. Bergmeister suggested that ring formation was due to tumor following circulus arteriosus iridis major.

REFERENCES.

1. Vose Solomon. "Melanosarcomatous Tumor Growing From the Iris of the Right Eye." Tr. O. S. of U. K. Vol. XX, 1882, p. 257.
2. Hanke. "Fall I. Pigmentirter Tumor Kammerbucht, ausgehend von den Endothelien des Kammerwinkels und des Ligam. Pectinatum in einem mit Glaukom behafteten Auge." v. Graefe's Arch. f. Ophthal. Vol. XLVII, 1898, p. 463.
3. Alt, A. "On a case of Partly Pigmented Spindle Cell Sarcoma of the Iris: Proliferating Choroiditis and Microscopic Hole in the Fovea Centralis." The American Journal of Ophthalmology. Vol. XXVIII, June 1911. No. 6.
4. Levan, L. "Beitrag zur Kenntnis der primären Irissarkoma." Klin. M. f. Augenh. Oct.-Nov. 1915, p. 493.
5. Pindikowski. "Ueber das Oberflächenwachstum intraokularer Sarkome zugleich ein Beitrag zur Kasuistik der Ringsarkome." Ibid. Vol. LIII, 1915, p. 516.
- Ring sarcoma of the ciliary body.**
6. Ewetzky. "Totales Flächensarkom der Iris und des Ciliarkörpers." v. Graefe's Arch. f. Ophthal. Vol. XLV, 1898, p. 600. Case VIII.
7. Kopetzky v. Rechtperg. "Ringförmiges Sarkom der Iris und des Ciliarkörpers." Ibid. Vol. LII, 1901, p. 330.
8. Parsons. "Ueber einen Fall von Ringsarkom des Ciliarkörpers." Ibid. Vol. LV-2, 1903, p. 350.
9. Werner. "Ring Sarcoma of the Uveal Tract Originating Close to the Angle of the Anterior Chamber. Intense Melanosis of the Iris and of the Angle of the Anterior Chamber in Its Whole Circumference." T. O. S. of U. K., Vol. XXV, 1904-05, p. 266.
10. Bergmeister. "Das Ringsarkom des Ciliarkörpers." v. Graefe's Arch. f. Ophthal. Vol. LXXV, 1910, p. 474.
11. Gibson. 1922. Medical Jour. Australia, Aug. 19, p. 215.

THE NOURISHMENT OF THE CORNEAL EPITHELIUM.

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In maintaining the health of the epithelium, the basement membrane may have an important function; the lacrimal and associated secretions are also important. It is also suggested that the churning of the blood in the heart may have an important bearing on cell nourishment.

Certain agencies are required by epithelium to maintain it in a viable state. The basement membrane is a factor of the first importance. This barrier which is interposed between the cell and the circulating fluids has not received very much attention, in regard to its influence on epithelial nourishment. By reason of its porous nature, it participates in all the laws of a dialyzing membrane. The theory of Overton¹, that the cell membrane is lipoidal and allows only fat soluble substances to pass, is of course predicated on the effect the basement membrane has in sifting the proper nourishment for the outlying cells.

The skin, for example, represents a graduated process of cellular necrosis (keratinization), as the cell is crowded away from the basement membrane and the nutritive substances become inaccessible. Mucous membranes in contrast are supplied with glands lodged in the mesodermal substratum, a location whereby they become the portal of exit for the necessary food elements, which

are contained in their secretions. The surface epithelium of several layers of cells is thus kept alive.

The mucous membrane of the mouth is supplied by the salivary glands, the nose by Bowman's glands. The eye is richly endowed with glands, but the chief one of course is the lacrimal gland.

Physiologists pretty generally have subscribed to the view, that no longer proteins but aminoacids are the basic forms in which the cell obtains its nourishment. This is largely due to the influence of Folin's² work. He demonstrated that aminoacids are not only absorbed unchanged, but that there is a marked accumulation of these substances in muscular tissue. This is no proof of their being food for cells as subsequent considerations will show. Such a stand is also in conflict with the more direct observations of Overton³.

Metchnikoff developed the phenomenon of phagocytosis from his early observations of intracellular digestion. He noticed that digestion and cell nourish-

ment in the lower multicellular organisms without an alimentary canal, was a function of the mesodermal cells. This digestive function when applied to bacteria is what we know as phagocytosis. This, however, is only one sphere of digestive activity. The white cells we well know

older view of Voit⁷, that circulating protein is essential to cell life, remains tenable for ectodermal tissue.

The epithelium of the conjunctiva and cornea then depends upon the lacrimal and allied glandular secretions to nourish the surface cells. They are multilayered.

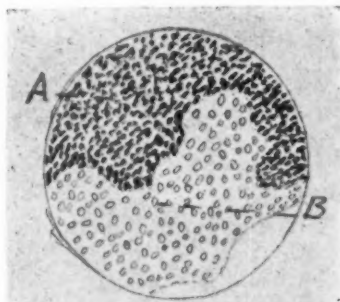


Fig. 1. Teased Corneal Epithelium. Lymphoid Cells. B

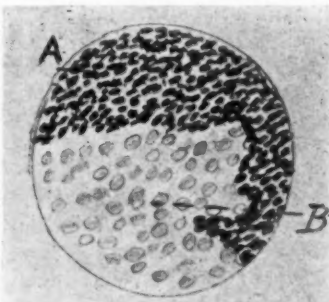


Fig. 2. Same, High Power. A Corneal Epithelium. B

take a very active part in the absorption of fat. Metchnikoff says, "to the morphologic difference of the phagocytes corresponds also a difference in the properties of their cytases, which are suited to the digestion of this or that food⁴."

This field of mesodermal digestion, except for the pioneer observations of Metchnikoff, lies fallow. The muscles as Folin found accumulate the nitrogenous products of alimentary digestion. Their function there on seems to be the conversion of these aminoacids to protein, and storing them as such. It is highly significant that there is a conspicuous absence of nitrogen in muscular activity⁵.

The only instances we have of artificial cellular growth have been under the methods inaugurated by Carrel⁶, who succeeded with protein bearing media (plasma). On these considerations the

The cornea is described as having a layer of club or cone shaped cells, adjacent to Bowman's membrane, then several rows of polygonal cells with protoplasmic bridges (prickle cells), and finally an outmost row or two of flattened cells⁸.

In a teased preparation of the corneal epithelium of the pig's eye, there was found a rather dense layer of lymphoid cells overlying the epithelium. They are also found in abundance in the secretion expressed from the lacrimal gland. They are found also in smears from the human eye, but in less conspicuous proportions and in variable amounts. This is not surprising since lymphoid tissue is found incorporated in the lacrimal gland⁹. In the dried secretion that collects at the inner canthus, these lymphoid cells are found vacuolated (signet ring figures), showing their function have been com-

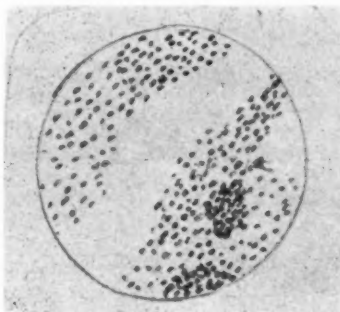


Fig. 3. Smear from lacrimal fluid.

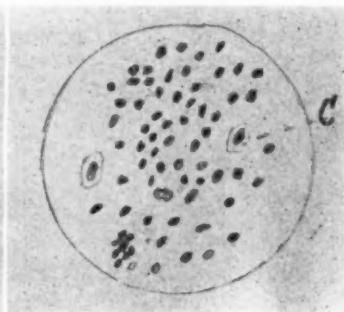


Fig. 4. Same, High Power. Glandular Epithelium.

pleted. They doubtless have a very definite function in the nourishment of the corneal epithelium, and probably in supplying its protein requirements.

In conclusion it might be well to call attention to altered conditions found in trachomatous pannus. The pathology here is a local destruction of lymphoid elements, with scar formation and more or less obstruction of the ducts. The lymphoid cells are then found making their way out into the cornea, beneath the epithelium and external to Bowman's membrane, attended by a new growth of blood vessels.

Furthermore smears or scrapings from the pannicular cornea shows a definition of the surface cells, i. e., protoplasmic connections which we find between nuclei in the normal epithelium have disappeared and a cell wall appears to enclose the nucleus and cytoplasm, a step toward keratinization.

CELL NOURISHMENT.

As bearing on the preparation of the cell's nutritive supply, an hypothesis may here be introduced ascribing a new function to the heart. A major portion of the fat absorbed from the intestine enters the general circulation by way of the left subclavian vein. It is soon in the heart and is there churned with the plasma proteins. These proteins have come from the portal and systemic circulations and are in a state of large aggregates or micellae.

The effect of the heart "beat" is to fracture the larger systems giving subdivisions or pseudoions. Unsatisfied bonds on these finer protein particles give them an electrical charge. Then fats thru their physical property of forming films insulate these protein particles by enveloping them in a lipoidal shell.

Blood returning from the lungs contains ionized sodium left by the escape of carbon dioxid. In the left ventricle a place is found for it on the protein (sodium globulinat) thru the mechanical action of the heart.

Thus the heart is a churn as well as a pump, and its interior is admirably suited or built for just this function. The chordae tendinae of the valves, the papillary muscles, the roughened side walls (columnae carnea) with the cryptic interspaces, all combine in the squeeze of the muscle to alter the physical state of the contained protein in the manner indicated.

Going out in the circulation and eventually into the lymph spaces, these protein particles furnish the tissues with nourishment and take up the CO₂ accumulation by giving up sodium.

The physiology of the leucocyte becomes more understandable under this concept. The cytase of Metchnikoff⁴, the growth promoting alexin of Carrel and Ebeling¹¹, the fat splitting function of the lymphocyte described by Gertal¹² and shared by Wassermann, and even the apparently dual function of hemolysis as observed by Carrel and Ebeling are reconciled when we adopt this mechanical structure of the protein particles. There is a lipoidal pellicle enclosing the hemoglobin according to Bechhold's studies¹³ of the red cell.

The lymphocyte occupies our attention mainly. At the proper place it gives off the cytase or alexin which cracks the enveloping fatty layer, releasing the contained protein for cell nourishment. The polymorphonuclears have a proteolytic action according to Fiessinger and Marie, Lange, Resch, Nees, and no lipolytic power according to Bergel.

REFERENCES.

1. Overton, C. E. Bechhold-Bullowa. *The Colloids in Biology and Medicine*, p. 239.
2. Folin, O., and Denis, W. J. *Journal of Biological Chemistry*. Vol. 11, No. 1. p. 87.
3. Overton, C. E. Starling, *Human Physiology*, p. 23.
4. Elie Metchnikoff, by Olga Metchnikoff, p. 175.
5. Starling. *Human Physiology*, p. 216. Mathews, *Physiological Chemistry*, 3rd Ed. p. 620.
6. Carrel, A. *Journal of Experimental Medicine*, Vol. 20. p. 1.
7. Voit. Hammarsten, *Physiological Chemistry*, p. 568.
8. Axenfeld, Th. *Lehrbuch and Atlas der Augenheilkunde*, p. 396.
9. Axenfeld, Th. *Lehrbuch and Atlas der Augenheilkunde*, p. 297.
10. Axenfeld, 6th Ed. p. 368. Fuchs-Duane 6th Ed. p. 170.
11. Carrel and Ebeling. *Journal of Experimental Medicine*, Vol. 36, No. 6, p. 645.
12. Bergel, S. *Deutsche medizinische Wochenschrift*, January 12, 1923, p. 51.
13. Bechhold-Bullowa. *The Colloids in Biology and Medicine*, p. 305.

EFFECT OF DRUGS UPON THE REGENERATION OF CORNEAL EPITHELIUM.

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Experiments here reported from the ophthalmologic laboratory of Washington University Medical School are to determine the influence of drugs upon regeneration of the corneal epithelium destroyed by a definite exposure to heat by the Shahan thermophore. The drugs tested were silver nitrat, holocain, zinc sulphat and normal saline solution. It is concluded that uninfected ulcers in rabbits yield more rapidly without treatment than with any of these drugs.

Having in the thermophore a means of uniform destruction of corneal epithelium, it was thought that it might be possible to so control experiments as to determine the effect upon the regeneration of corneal epithelium of certain commonly used eye medicines.

It was found that when the thermophore was applied at 130° for one minute to the cornea, an area, corresponding closely to the area of the contact surface, was denuded of epithelium. Greater heat or longer exposures caused marked infiltration of the substantia propria of the cornea, while less heat failed to uniformly destroy the epithelium. Accordingly, in all of these experiments, a circular concave contact surface of 8 mm. in diameter was applied at 130° for one minute to each of a rabbit's cornea. One eye was then treated with the drug to be tested. The untreated eye was used as a control. The extent of the epithelial defect was determined by staining with fluorescein and measuring on a millimeter scale. Whatever effect the fluorescein may have had on the healing, that effect was equal in each eye, as fluorescein was always used at the same time in each eye.

Preliminary experiments showed that the average time required for the healing of a round defect of 7 mm. in diameter was 48 hours. This varied considerably. Where the nutrition of the rabbit was interfered with, healing was delayed—in one case as long as five days. When the rabbit was kept in the dark healing was retarded. Repeated heatings did not seem to cause a retardation of the overgrowth of the epithelium, but the epithelium so formed showed a tendency to disappear in spots, leaving pin head sized or smaller defects which would stain with fluorescein many days after the heating.

Inasmuch as we know that in man epithelial defects of the entire cornea sufficient to permit of staining with fluorescein are often repaired in 24 hours, the average of 48 hours for repair of less than one-half of the rabbits cornea seems rather slow. There was noted a latent period after heating, in every case, of almost 24 hours, during which there was practically no decrease in the size of the area taking the stain with fluorescein. It would appear, therefore, that the heating had been more of an injury than the average trauma causing exfoliation of the corneal epithelium, in which repair begins practically at once and is completed in 24 hours. In the latter case it would seem probable that the entire thickness of the epithelium had not been removed and regeneration had been from underlying living epithelium cells as well as from the edges. In the heat experiments, there was a destruction thru the entire thickness of the epithelium and regeneration of necessity took place only at the edges of the wound.

Experiments were made with silver nitrat one-fourth of one percent; holocain 1 percent; zinc sulphat one-fourth of one percent, and normal saline solution.

In six experiments with silver nitrat, the frequency of instillations was varied from one drop every hour for eight hours of the day, to one drop three times a day. In two cases the treatment delayed the healing: in one, 24 hours; in the other, two days. In three cases healing was practically simultaneous in the treated and in the control eyes, while in one case in which the control eye originally stained 25% more than the treated eye, probably due to an unnoticed movement of the eye during the heating, the healing in the control was completed 24

hours later than in the treated eye. Considering the difference in the size of the original denuded area, this does not indicate a more rapid rate of healing in the treated eye, but merely that there was more repair necessary in the control eye.

In three experiments, holocain 1% was used. In one of these the holocain was used four times during the day, and in the other two cases holocain was used every hour during the day. In two of these experiments, the treated eye was slightly the slower in replacing the epithelium, while in the third the replacement was complete practically synchronously in the treated and the untreated eyes.

One experiment was tried with zinc sulphat in the strength of one fifth of one percent. In this, the replacement of the epithelium was the same in the treated and the untreated eyes. In this experiment the animal was kept in the dark. Healing was not complete in either eye for four days.

Three experiments were made using normal saline in one eye. Healing in each case was completed a few hours later in the treated eye than in the untreated eye. This was rather contrary to expectations, because it has been shown by Burrows¹ that epithelial cells growing in vitro are greatly activated by the addition of normal saline to the plasma in which the epithelial cells are implanted. This increased rate of growth, however, took place when the saline was used in certain optimum concentrations only, other concentrations being too great or too small to act beneficially. Quite possibly the drops of saline in our experiment were quickly diluted and acted for too short a time to have much effect.

With each drug that we used, the rate of replacement of the epithelium in the treated eye and in the untreated eye was so nearly the same that it seems safe to conclude that none of the drugs that we tried in the weak concentrations in which they are usually applied has any material effect on the rate of the replacement of epithelium in uninfected ulcers. By a method whereby solutions are kept in constant contact with the cornea, such drugs as saline, which has been elsewhere shown to activate epithelium, might have a stimulating effect; but, in-

asmuch as hourly treatment during the day is about the limit of practicability in animal experiments, tests were not performed with more frequent instillations than this.

The most probable explanation of the usual slight retardation of the healing in the treated eye seems to be largely a mechanical one. As soon as the lids are released after each treatment the rabbit bats the lids rapidly, and in so doing may well enough damage the exposed edge of the ulcer and interfere with the activities of the bordering epithelial cells. The retardation in the experiments with normal saline suggests a mechanical rather than a chemical interference.

In conclusion, it would seem that the uninfected ulcer in rabbits will heal more rapidly without treatment than with any of the drugs tried, and that whatever will increase the comfort of the animal and allay mechanical irritation will be of value in aiding the healing.

PROTOCOLS.

Experiments 1 to VI inclusive were tests with silver nitrat one-fifth of one percent in aqueous solution.

EXPERIMENT I.

Sept. 12, 1919. Applied 8 mm. round contact surface at 130° for one minute to a similar spot on the cornea of each eye. O. D. was treated four times a day with silver nitrat until ulcer healed. O. S. No treatment.

Sept. 13, 1919. 24 hours after heating. O. D. stained with fluorescein over a round area 5 mm. in diameter. O. S. ditto.

Sept. 14, 1919. 48 hours after application. O. D. No stain. O. S. Do.

EXPERIMENT II.

Sept. 19, 1919. Applied 8 mm. round contact surface at 132° for one minute to a similar spot on the cornea of each eye. O. D. was treated with silver nitrat three times a day. O. S. No treatment.

Sept. 20, 1919. 24 hours after heating. O. D. Stained over an area slightly larger than O. S. Treated O. D. three times a day. O. S. No treatment.

Sept. 21, 1919. 48 hours after application. O. D. stained over an area 2 mm. in diameter. Treated three times during day. O. S. No stain.

Sept. 22, 1919. O. D. Still slight stain with fluorescein.

Sept. 24, 1919. O. S. As on 22nd.

EXPERIMENT III.

Sept. 12, 1919. Applied 8 mm. round contact surface at 130° for one minute to a similar spot on the cornea of each eye. O. D. treated with silver nitrat four times a day. O. S. No treatment.

Sept. 13, 1919. 24 hours after heating. O. D. stained over an area 5 mm. in diameter. O. S. Ditto.

Sept. 14, 1919. O. D. No stain. O. S. No stain.

EXPERIMENT IV.

Sept. 17, 1919. Applied 8 mm. contact surface at 132° for one minute to a similar spot on the cornea of each eye. Immediately after heating. O. D. stained over an area 5 1/2 mm. in diameter. O. S. stained over an area 7 mm. in diameter. O. D. was treated with silver nitrat eight times a day.

Sept. 18, 1919. 29 hours after heating. O. D. stained over an area 3 mm. in diameter. Treated eight times during day.

Sept. 19, 1919. O. D. No stain. O. S. Slight stain.

EXPERIMENT V.

Sept. 15, 1919. Applied 8 mm. round contact surface for one minute at 130° over a similar spot on the cornea of each eye.

Sept. 16, 1919. O. D. treated with silver nitrat seven times during day. O. S. No treatment. 24 hours after heating. O. D. Uniform stain over denuded area 7 mm. in diameter. O. S. Ditto.

Sept. 17, 1919. 48 hours after application. O. D. Slight stain at one pin head sized spot. O. S. No stain.

EXPERIMENT VI.

Animal kept in dark.

Sept. 22, 1919. Applied 8 mm. round contact surface at 131° for one minute to a similar spot on the cornea of each eye. O. D. treated with silver nitrat three times a day. O. S. No treatment.

Sept. 23, 1919. O. D. treated three times during day. O. S. No treatment.

Sept. 24, 1919. 48 hours after heating. O. D. No change in size of stain. O. S. Ditto.

Sept. 26, 1919. O. D. Ulcer about 3 mm. in diameter. O. S. Ditto.

Sept. 28, 1919. O. D. No stain. O. S. No stain.

EXPERIMENTS VII. to IX. inclusive were tests with holocain 1% in aqueous solution.

EXPERIMENT VII.

Oct. 20, 1919. Applied 8 mm. round contact surface at 129° for one minute to a similar spot on the cornea of each eye.

Oct. 21, 1919. 14 hours after heating. O. D. stained over an area 6x7 mm. Treated with holocain 1% four times day. O. S. stained over an area 10x7 mm. No treatment.

Oct. 22, 1919. 48 hours after heating. O. D. two small areas take stain. Treated twice with holocain 1%.

Oct. 22, 1919. O. S. One small area stains slightly. No treatment.

Oct. 23, 1919. O. D. No stain. O. S. Ditto.

EXPERIMENT VIII.

Aug. 29, 1922. 2 P. M. Applied 7 mm. contact surface at 130° for one minute to a similar spot on the cornea of each eye. O. D. treated with holocain 1% every hour for three hours. O. S. No treatment.

Aug. 30, 1922. O. D. treated with holocain 1% every hour for 8 hours. 24 hours after heating, stained area measured 4x8 mm. O. S. Denuded area stained 5 mm. in diameter.

Aug. 31, 1922. 48 hours after heating. O. D. stained over an area 8x1 1/2 mm. Treated with holocain 1% every hour for 8 hours. O. S. Denuded area stained 3x2 mm.

Sept. 1, 1922. O. D. Small area stained. O. S. No stain.

EXPERIMENT IX.

Aug. 29, 1922. 2 P. M. Applied 7 mm. contact surface at 130° for one minute to a similar spot on the cornea of each eye. O. D. treated with holocain 1% every hour for three hours. O. S. Not treated.

Aug. 30, 1922. 24 hours after heating. O. D. stained over an area 6 mm. in diameter. Treated with holocain 1% every hour for 8 hours. O. S. stained

over an area 5 mm. in diameter. No treatment.

Aug. 31, 1922. 48 hours after heating. O. D. Heated area stains over two pin head sized areas. Treated with holocain 1% every hour for 8 hours. O. S. stains over 3 pin head sized area. No treatment.

Sept. 1, 1922. O. D. No stain. O. S. Ditto.

EXPERIMENT X.

Experiment X was a test with zinc sulphat one-fifth of one percent in aqueous solution, the animal was kept in the dark.

Sept. 24, 1922. Applied 8 mm. contact surface at 130° for one minute to a similar spot on the cornea of each eye. O. D. treated with zinc sulphate 1/480 three times a day. O. S. Not treated.

Sept. 28, 1922. Less stain each day. About equal in each eye. No stain in either eye today.

EXPERIMENTS XI to XIII inclusive were tests with normal saline.

EXPERIMENT XI.

Sept. 11, 1922. Applied 8 mm. contact surface for one minute at 130° to a similar spot on the cornea of each eye. O. D. treated with saline every hour from 3 to 5 p. m. O. S. No treatment.

Sept. 12, 1922. 24 hours after heating. O. D. stained over an area 5x6 mm. O. S. stained over an area 5 mm. O. D. treated with saline from 9 a. m. to 5 p. m. every hour. O. S. No treatment.

Sept. 13, 1922. 44 hours after heating. O. D. stained over an area 1 mm.

Treated hourly from 9 a. m. to 5 p. m. O. S. No stain.

Sept. 14, 1922. O. D. No stain.

EXPERIMENT XII.

Sept. 11, 1922. 1 p. m. Applied 7 mm. contact surface at 132° for one minute to a similar spot on the cornea of each eye. O. D. treated every hour for four hours. O. S. No treatment.

Sept. 12, 1922. 24 hours after heating. O. D. Heated area stained 5 mm. in diameter. Treated with saline six times during day. O. S. Heated area stained over an area 5 mm. in diameter. No treatment.

Sept. 13, 1922. 48 hours after heating. O. D. stained over an area 1 mm. in diameter. Treated three times during day with saline. O. S. No stain.

Sept. 14, 1922. O. D. No stain.

EXPERIMENT XIII.

Sept. 20, 1922. Applied 7 mm. contact surface at 135° for 70 seconds to a similar spot on the cornea of each eye. O. D. Heated area stained 7 mm. in diameter. Treated with saline. O. S. Heated area stained 8 mm. in diameter. No treatment.

Sept. 21, 1922. 24 hours after heating. O. D. Heated area stained 5 1/2 mm. in diameter. Treated with saline six times during day. O. S. Heated area stained 6 mm. in diameter. No treatment.

Sept. 22, 1922. 48 hours after heating. O. D. Heated area stained 1 1/2 mm. in diameter. Treated with saline three times during day. O. S. Ditto. No treatment.

Sept. 23, 1922. O. D. and O. S. No stain.

BIBLIOGRAPHY.

Burrows, M. T. "The Tissue Culture as a Physiological Method." Transactions of the Congress of American Physicians and Surgeons, 1913, page 83, v. ix.

PAPILLITIS WITH FOCAL INFECTION.

LEIGHTON F. APPLEMAN, M.D.

PHILADELPHIA, PA.

This is the report of a case of gradual failure of vision extending over six years. There was some narrowing of the field and enlargement of the blindspot. In each eye the optic disc was hidden by the swelling of papillitis. The teeth were found in bad condition. Twelve were extracted and the others treated. Improvement in all conditions began and went on to complete recovery. Read before the Section on Ophthalmology of the College of Physicians of Philadelphia, November 16th, 1922.

Certain interesting facts in connection with the case which is here recorded has impelled me to bring it before the Section:

I. W., aged 37, a train flagman in the employ of the Philadelphia and Reading Railway, was referred to me by Dr. A. R. Vaughn on April 21, 1922, with the history of failing vision.

He stated that about six years previously, when vision was tested in the routine yearly examination of the railroad, he first noticed that his sight was not as good as it had been, and altho he succeeded in passing subsequent tests, partly because he knew the card on which the tests were made, he nevertheless realized that vision was progressively worse each year. Finally, in a test given a short time before I saw him, he failed to pass, as a different card was used to make the test. He was therefore directed to have his eyes examined for glasses.

When he consulted me, vision in each eye was 6/15; reading was difficult, and was accompanied by a feeling of strain in both eyes; he had slight frontal headache at times, but not constantly. His appetite was not good, and he stated that he was subject to considerable indigestion. Luetic infection was denied; he did not complain of any catarrhal trouble; he admitted that his teeth were bad and had been for a long time and inspection revealed the molars and bicuspid teeth on both sides badly decayed, and some broken off. X-ray report showed necrosis around the roots of these teeth.

He has been married for 16 years, has three children, all living and healthy. Ophthalmoscopic examination, under a mydriatic, revealed, in the right eye, a few punctate opacities in the posterior lens cortex, otherwise the media were clear. The optic disc was swollen to the extent of from 2 to 3 diopters, occupying

an area about twice the size of the normal disc, its borders merging gradually with the surrounding retina; its surface was grayish in color, the normal outlines were completely obscured. The veins were full, and tortuous; the arteries about normal size; no hemorrhages were present. The periphery of the eyeground was normal.

The left eye showed similar changes, the extent and amount of swelling being the same.

The visual field of the right eye showed beginning concentric contraction for form and colors, particularly red and green, with the blind spot about twice the usual size; the left eye showed much more marked concentric contraction for form and colors, with a blind spot about three times normal size, as shown by the accompanying charts.

A Wassermann blood test was ordered, and later reported negative.

He was told to see his dentist and have the condition of his teeth corrected. This he did, and when I next saw him, on May 2nd, he stated that he had had seven teeth extracted. All were affected and very carious, and one had a "regular little pus bag" attached to it, as he expressed it. He also volunteered the information that the odor was "awful" when they were pulled. His appetite had improved, he slept better and felt better; vision had improved to O. D. 6/9; O. S. 6/9-2. The optic discs were less swollen and, altho the edges were still blurred I had the impression that the papillitis was less marked.

As the dentist had not finished his work, he was advised to go back as often as necessary until all this work was done. He subsequently had five more teeth extracted, making 12 in all.

I did not see him again until September 20, 1922, on which date he presented himself with the statement that he felt

fine, the eyes never feeling better; he had passed two tests before the medical examiners since I had last seen him, a little over 4 1/2 months previously. Vision was O. D. 6/6; O. S. 6/6.

slightly full, arteries normal; no lesion in the periphery. The visual field had returned to normal for form. To me, the improvement in each eye was most remarkable.

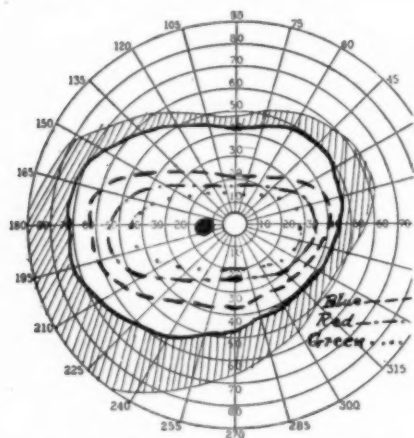


Fig. 1. Left field, J. B., April 22. Taken by daylight.

With the ophthalmoscope, in the right eye the optic disc, while presenting a slight general haze, was well outlined all around, the color was almost normal, no cup, no swelling, vessels about normal in course and size, no peripheral changes.

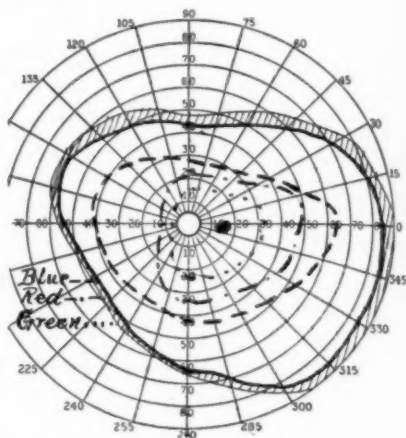


Fig. 2. Field of right eye, April 22. 10 mm. test object for periphery and color fields; 5 mm. for blind spot.

In view of the fact that this patient noticed, six years ago, that the sight was then not as good as it had formerly been, and that at each yearly examination he noticed that it was progressively failing,

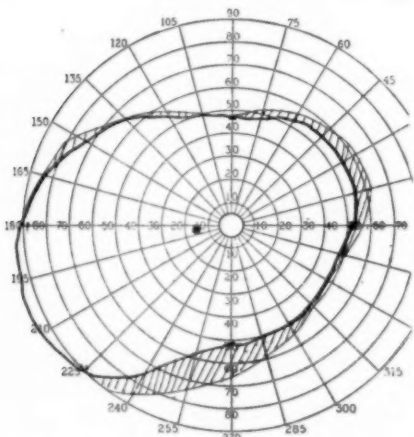


Fig. 3. Left field, J. B., Sept. 20. Taken by daylight.

In the left eye, the swelling had subsided to such an extent that the outlines of the disc are clearly seen on the temporal side, with a return to more nearly normal color. Over the nasal half slight swelling could still be seen and the edge was slightly hazy. The veins were

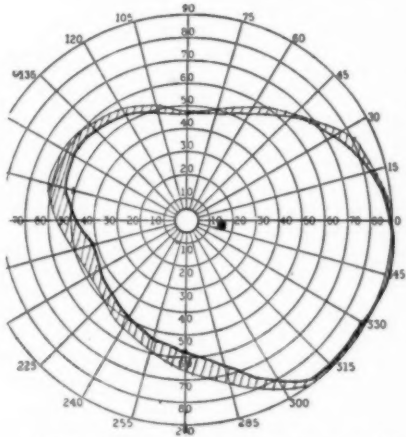


Fig. 4. Right field, J. B., Sept. 20. 10 mm. object for periphery; 5 mm. for blind spot.

it is not improbable that the condition of his teeth may, at that time as well as subsequently, have been the cause of his gradual loss of vision.

While the literature abounds with reports of ocular disturbances as the result of dental foci of infection, they are

usually in the form of orbital cellulitis or abscess, periostitis, uveitis, retrobulbar optic neuritis, corneal ulcerations and inflammations, etc. I am unable to find any references to papillitis as one of the manifestations of dental infection.

A. D. Black (Ophthalmic Record, Dec. 1915) gives a list of 27 different ocular lesions as having been traced to dental lesions, comprising sensory, vasomotor, and muscular disorders, together with inflammations of the various tissues of the eye.

The transmission of organisms or toxins from diseased teeth to the eyes is supposed to occur, (1) by direct extension thru bone. Caries of the bone of the upper jaw from an apical abscess may, by extension, cause abscess of the lids or of the sinuses, periostitis and emboli; (2) by extension along the periosteum, involving the orbit; (3) thru the blood stream, which is believed to explain the transmission to structures within the eyeball, and (4) thru the lymphatics.

It has also been pointed out that infection originating in a tooth abscess may set up secondary foci in other parts of the body which may still furnish the toxins necessary to perpetuate the ocular inflammation even after the removal of the offending tooth. Under such circumstances, the only hope of combating the infection, as pointed out by Benedict (American Journal of Ophthalmology, December, 1920), would be in the use of an autogenous vaccine. This would necessitate a culture at the time of extraction of a tooth to determine the causative agent.

As to the mode of transmission in the case under consideration, I am unable to state, but, in view of the prompt subsidence of the swelling of the optic nerve and the rapid improvement in vision following the extraction of his diseased teeth, together with the negative Wassermann and the absence of symptoms referable to the nose or sinuses, or other structures, it seems to me that a causal relation must be corrected.

PSEUDOGLIOMA AND REMAINS OF THE TUNICA VASCULOSA LENTIS.

SANFORD R. GIFFORD, M.D. AND JOHN STEVENS LATTA, M. D.

OMAHA, NEBRASKA.

The eye of a child of three months was enucleated for suspected glioma. A yellowish reflex had been noted in the pupil soon after birth and there had been no inflammation. The posterior surface of the lens was covered by dense gray mass. Two other cases are reported in which less dense opacities were studied with slit lamp microscopy. The report is made from the Departments of Ophthalmology and Anatomy, University of Nebraska Medical College.

Lent and Lyon¹ in a recent article state that glioma is differentiated from persistent fibrovascular sheath of the lens by its rapid growth and by its being visible thru the naked aperture of the ophthalmoscope.

A case seen recently illustrates vividly the fact that this differentiation may not always be a simple matter, and its clinical and pathologic interest make it seem worth while to report it, along with several related cases.

CASE 1. Ward C, aged three months, was seen with Dr. H. Gifford August 19th, 1921. The child's parents had noted a yellowish appearance in the pupil of the right eye soon after birth. Thru the pupil a whitish mass could be made

out, apparently in the vitreous, just back of the lens. Only a faint pinkish reflex could be obtained thru it in places. No vessels could be made out on its surface. The eye was somewhat smaller than the left eye, but symmetric, and with no other external anomalies. It was not congested and tension was not increased. Both eyes were examined under a general anesthetic, and the fundus of the left eye appeared normal. There was no history suggestive of ocular tuberculosis or other metastatic infection, and as a diagnosis of glioma seemed the most probable one, enucleation was considered the safest course, and this was performed by Dr. Harold Gifford. On opening the eye after operation, the

vitreal chamber appeared normal, but the posterior part of the lens was covered by a dense greyish mass. This appeared to be in the lens itself, and it was only when sections were made that the true condition was appreciated.

The case has been seen several times recently at the age of two years. The right socket is in good condition and the left eye appears normal.

lens which normally stops at its equator was continuous over its entire posterior surface. The increased posterior diameter of the lens allowed it to extend backward for some distance into the vitreal chamber, the ciliary processes, in connection in this case with its posterior surface, being correspondingly lengthened (Fig. 1).

The embryologic explanation of these



Fig. 1, Case I. A. Nodule of fibrous tissue back of lens. B. Site of lens removed from section. (Note globular shape.) C. Ciliary processes fused with lens capsule.

Serial sections showed the entire posterior surface of the lens to be covered by a thick mass of dense white fibrous connective tissue.

The ciliary processes were very long, extending to the posterior side of the almost spherical lens to become rather closely associated with the lateral border of the fibrous mass. The lens was not pushed forward into the anterior chamber, the iris being in normal position, at same distance from the tumor which was lying posterior to the lens. In this instance (as in the cases of Dötsch and Ginsberg) the epithelial covering of the

conditions was thought to be that this connective tissue mass represented a retained portion of the fibrovascular sheath of the lens which had early acquired vascular connection with the ciliary processes, with consequent continued growth and hypertrophy instead of atrophy following the loss of blood supply upon the disappearance of the hyaloid artery. The connective tissue was so large in amount as to warrant classification of this structure as a fibroma. (Fig. 2) Neuroglia stains (as Benda's) were used in an attempt to discover any possible glial elements with negative results, the entire

mass staining typically, however, with all ordinary connective tissue stains (as Mallory's C. T. stain).

CASE 2. Hazel H, aged five, was brought in on account of poor vision and convergent squint of the left eye. Since birth a whitish spot had been noticed in the pupil. By focal illumination this was seen to be a round whitish opacity about one-eighth inch in diameter, just

later. The right eye was normal, except for two and one-half diopters of hyperopia.

CASE 3. Joseph C, aged eleven, was seen on account of poor vision in the right eye and a white spot noticed in the right pupil since infancy. Both eyes showed a constant slight horizontal nystagmus. The fundus of the left eye was slightly albinotic, but vision was



Fig. 2. Case 1. High power showing fibrous structure with vessels at A.

back of the posterior lens capsule. By slit lamp illumination, after mydriasis by homatropin, this round opacity was seen to be surrounded by a much thinner greyish film, roughly circular in outline, but sending off pointed processes which passed as delicate threads out of sight beneath the iris. This outer ring, with its processes, was almost entirely transparent to ophthalmoscopy, and behind it was seen a broad persistent hyaloid artery passing back to the disc. No blood could be seen in the cord, and no vessels were made out in the opacity on the lens. Vision was hand movements, which remained the same when the slit lamp examination was made, two years

brought up to 20/30 with correction for its four diopters of hyperopia. The left eye when first seen by Dr. Harold Gifford in 1916, had vision of counting fingers at fourteen inches. In the anterior lens cortex was a quadrilateral opacity extending from near the center down and in beyond the pupillary border. On the posterior lens capsule somewhat below the center was an oval opacity. (Fig. 3.) By ophthalmoscopy and slit lamp examination there could be seen behind this a stout cord of white fibrous tissue, which bent down and then up again, spreading out to a veil which covered most of the disc. Two vessels, apparently containing blood, could be seen in the

cord, which seemed to join the retinal vessels beneath the veil. The fundus was otherwise normal and remained so at subsequent examinations in 1920 and April, 1922. In September, 1922, vision in this eye was reduced to shadows, with projection fair. Detachments of the retina up and out, up and in, and down and in were present, involving most of the retina. Otherwise conditions were as before.

Literature: Vogt² has shown that a microscopic hyaloid rest and also microscopic remains of the tunica vasculosa lentis are very common; to be found by careful search in nearly all young adults, in fact. The former is usually seen, how-

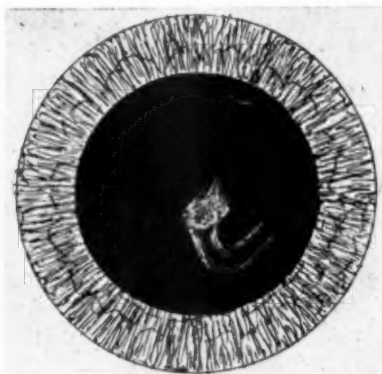


Fig. 3. Showing insertion of hyaloid in posterior lens capsule.

ever, only by slit lamp illumination as a slender thread attaching in the posterior lens capsule and floating free in the vitreous. Larger remains of its attachment, visible by the ophthalmoscope, but not large enough to interfere with vision (the so-called Mittendorff's dot) are also quite common.* Persistence of a larger cord, often with considerable visual defect, has been reported fairly often and these cases are summed up by Lent and Lyon¹. In a number of these cases there has been present along with a more or less incomplete hyaloid artery, remains of the tunica vasculosa lentis. Reports of this condition are not very rare and a complete digest of cases will not be attempted.

In Manz³ case only a short tag of the artery was left attached to the nerve, but a semitransparent mantle surrounded this, running forward to a circular at-

tachment covering about 1/3 of the posterior lens capsule. Ruhwandl's⁴ case showed a quadrilateral greyish white opacity at the attachment to the lens with fine lines radiating to the periphery, thus resembling our case 2. The persistent hyaloid sent off two threads ending free in the vitreous, which are interesting as probably representing remains of the vasa hyaloidea propria, the fetal blood supply to the vitreous. It seems likely that bands of similar origin must have been present in our case 3, to account for the detachment of the retina which developed. Carreros-Arrago's⁵ case showed thread like opacities in the posterior cortex.

Otto⁶ saw in one case an oval opacity two by three mm. in size, surrounding the posterior pole of the lens, and in another a sector shaped opacity partly in the posterior cortex and partly on the capsule. Both showed persistent hyaloid arteries and vision was 20/100 and 20/200. Lane's⁷ first case showed a chalky oval opacity, four by six mm. in size, on the posterior capsule, with a vertical slit giving a red reflex. A complete hyaloid cord was present. In Gardner's case (quoted by Brückner⁸) the remains were more extensive, and it represents a transition type to the cases about to be described. The artery showed a funnel shaped insertion to the posterior capsule, with numerous fine vessels filled with blood branching on the capsule. De Beck⁹ reports a case with a network of fine striae in one eye almost covering the posterior capsule, but allowing a view of the fundus in their interstices. No other hyaloid remains were present. The other eye and both eyes of the second case, showed similar striae but much less extensive. He quotes four similar cases.

*It may be worth emphasizing that these dots are not at the center of the lens capsule, but 1/2 mm. to the nasal side. This fact and its embryologic explanation was first noted by Mittendorff¹⁰⁻¹² and confirmed by H. Gifford²³ in reports which Vogt seem to have overlooked. Their frequency was noted by DeBeck⁹, who observed them in three cases during one morning clinic. Mittendorff found them in 145 out of 20,000 eyes examined, and H. Gifford in 31 out of 1,500 cases, or 2%. They are often overlooked, as they are not progressive and have no effect on vision.

The subject of such persistent anomalies has been well summarized by Brückner,⁸ and other reported cases are cited.

While there is no embryologic distinction, except one of degree, between these cases and those of so-called pseudoglioma, there is a quite definite clinical distinction. While the term pseudoglioma is used to describe cases of infants with any mass in the vitreous, of tuberculous or other inflammatory origin, the cases of interest here are only those, such as our case 1, where the embryologic remains were so extensive that the diagnosis of glioma was possible. For this to be true, they must be extensive and opaque enough so that no view of conditions in the fundus is obtainable. Thirteen cases of this kind have been found in the literature, with necropsy findings. Probably the first case was that reported by Nettleship¹⁰ in 1873. This was a girl of five, who had been examined at the age of two and similar conditions noted. The complete opacity behind the lens, however, led to enucleation, when two cords were seen to join the nerve to a fibrous structure at the back of the lens. This extended over the ciliary body and retina back to the nerve, and was interpreted as a thickened hyaloid membrane. It was composed of reticulated connective tissue, and was in some places twice as thick as the retina. Brailey¹¹ saw a girl of three, whose right eye had been inflamed two years before and was later found to be blind and enucleated. Sections showed a clear lens with a dense white fibrous opacity covering its posterior capsule and extending to the ora serrata, covering the ciliary processes with a fine fibrillated tissue. In these cases the clinical notes are very meager.

Vassaux¹² saw a case clinically typical of glioma. In a two months infant a yellowish mass was seen behind the lens, with many vessels visible on its surface. The pupil dilated irregularly and tension was increased. Nothing could be seen of the fundus. The eye was enucleated for probable glioma. A mass 7 mm. thick surrounded the posterior lens capsule, composed of tissue resembling a fibroma and growing thru a tear in the posterior capsule for a little distance into the lens substance. The ciliary processes were long and glued to the lens by a mass of

amorphous exudate, which entirely cut off communication between the two chambers, so that the lens was pushed forward almost to the cornea. The peripheral vitreous showed numerous remains of the vasa hyaloidea propria, some containing blood cells. Vassaux mentions a previous case with a less extensive condition probably of similar origin, in which the eye was enucleated for glioma. Hess¹¹ describes the eye of a three weeks old infant obtained at postmortem, which showed multiple anomalies. The persistent hyaloid was attached in a thick fibrous membrane covering the greater part of the posterior capsule, and receiving numerous vessels from the hyaloid artery. From the membrane a thread passed thru a coloboma of the iris and spread out over the anterior lens capsule, also sending a process into the pectinate ligament. Hess believed this thread was responsible for the coloboma. In Grolman's¹⁴ case, one eye of a 12 year old child had been small from birth, with a cataract. It was tender, had no light perception, the iris was adherent to the opaque lens, and the eye was removed on a suspicion of sympathetic irritation in the other eye. It showed complete retinal detachment, a complete hyaloid artery, whose sheath was continuous with a mass of connective tissue which surrounded and partly replaced the posterior lens capsule. Fibrous masses were present in the lens itself, and vessels which contained blood and seemed to be continuous with the hyaloid artery. In these last two cases, besides the persistent sheath of the lens, marked microphthalmos in one case and coloboma in the other pointed plainly to a congenital anomaly, so that glioma did not come in question. In the cases of Dötsch¹⁵ and Ginsberg¹⁶ much more marked degrees of microphthalmos were present, and other anomalies so complicated the anatomic picture that they can hardly be included in this class of cases.

Collins¹⁷ examined the eyes of four infants, all under nine months of age, all of which were enucleated for suspected glioma. In one, the opacity was not complete, so that a red reflex could be obtained around it. The correct diagnosis was made at first, but later, as the opacity seemed larger, glioma was thought

possible and it was enucleated. A complete hyaloid artery extended to a white membrane of connective tissue back of the lens, to which the ciliary processes were adherent. In two others the artery was complete, while in one there was no trace of a persistent artery, and the spindle shaped mass of cells was partly inside and partly outside the lens capsule. Some blood was present between the lens fibers, but no vessels were seen, and Collins believes this blood came from a hyaloid which had disappeared after an abnormally long persistence, during which the fibrous growth had formed. In the other cases the opacity completely covered the posterior lens capsule, and no other anomalies were visible, so that the picture must have greatly resembled glioma. In all the cases the epithelial covering of the lens, which normally stops at the equator, extended back to near the posterior pole as in our case 1. He explains this by the constant adherence of the ciliary processes to the posterior surface of the lens, so that the lateral pull which they normally exert on the lens as the eye grows is removed, and the nucleated cells, instead of flattening into lens fibers, continue to extend around the capsule itself. Parsons¹⁸ saw two quite similar cases in infants under six months. In the first, the white mass seen behind the lens was complete but showed no blood vessels. It was considered probably not glioma, but enucleation on suspicion was considered the safest course. There was no trace of a persistent hyaloid, but a fibrocellular mass was present behind the lens, partly replacing the posterior capsule. In the second case numerous vessels were seen on the surface of the postlental mass. Since there was no red spot in its center indicating a hyaloid artery, and since no red reflex could be obtained around it, glioma was considered probable. The eye was smaller than normal, with a persistent hyaloid and a lens shaped fibrous mass resembling that in the first case, except that the lens capsule was continuous in front of it.

In Salfner's¹⁹ case the eye of a ten months infant was removed for suspected glioma, tho other defects were present which might have permitted a diagnosis. Besides persistent hyaloid and vascular

sheath of the lens, complete coloboma of the iris down was present, and a fibrous septum enclosing the hyaloid artery divided the bulb into temporal and nasal halves, and formed a large cyst in the area of the coloboma. The vascular tunic of the lens was almost complete, its vessels being continuous with the iris vessels anteriorly and the hyaloid system posteriorly.

DeVries²⁰ saw a ten months old infant which likewise had typical iris coloboma, with a white mass behind the lens showing vessels on its surface. It seemed to be increasing in size, so the eye was enucleated. The conditions proved to resemble closely those in Hess' case. The hyaloid artery branched freely in a fibrous mass behind the iris vessels and anastomosed with a large vein passing into the ciliary region. In a second case, the much less extensive membrane on the posterior capsule was not associated with hyaloid remains, and for several reasons was believed to be due to intrauterine inflammation.

Lane⁷ has recently described a case with fairly extensive remains behind the lens. The boy of six had vision R. E. of counting fingers, and showed a shiny white opacity surrounding the posterior surface of the lens with some vessels across its surface. The densest opacity was up and in, spreading out to a fine network elsewhere. There was no evidence of a persistent hyaloid, but there were remains of the pupillary membrane, and a diagnosis of persistent fibrovascular sheath was made. From the description, this case seems to have had the most extensive remains of any in which this diagnosis was made and adhered to, all the others having been enucleated, most for fear of possible glioma. This was true in three other cases whose pathologic examination was made by Lane, all of these being in small infants. In all three cases the mass seen ophthalmoscopically proved to be remains of the fibrovascular sheath of the lens, associated with hyaloid remains. In one, the hyaloid artery still supplied the mass with blood. In the others, it was reduced to a thread. Two of the eyes were smaller than their fellow, and one had remains of a pupillary membrane. Lane concludes that the presence of an opaque

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OPAQUE NERVE FIBRES. APPEARANCE OF THE EYEGROUND. (LERNER'S CASE)

vascular mass behind the lens in eyes with other congenital anomalies should suggest persistent fibrovascular sheath of the lens.

Discussion: From the description of these cases, it is evident that more or less extensive persistence of the tunica vasculosa lentis is not very rare, and that in cases of most extensive persistence, the question of glioma may have to be considered. Collins¹⁷ states that out of twenty-four eyes removed at Moorfields' for glioma, in seven this diagnosis was incorrect, and four of these were cases of persistent tunica vasculosa lentis. Unless glioma can be excluded with reasonable probability, waiting for evidence of further growth is throwing away the patient's principal chance of life, should the condition turn out to be glioma. Puncture, with removal of fluid

for diagnosis, as once suggested by Panas, would involve too much danger of extension outside the globe, and would, I think, be condemned by most modern surgeons.

In some cases, other anomalies, such as coloboma and persistent pupillary membrane, have pointed to a congenital condition, in others the affected eye has been smaller than its fellow, while in others there has been no such indication present. In our Case 1, the fact that the eye was slightly smaller than the other might have justified a period of observation which would have resulted in the correct diagnosis. Since Ginsberg¹⁶ has shown, however, that glioma may affect a microphthalmic eye, this would not have been without danger, and in any case, the eye would never have developed useful function.

BIBLIOGRAPHY.

1. Lent and Lyon. *A. J. Oph.*, 1922, 6, p. 706.
2. Vogt. *Atlas of Slit Lamp Microscopy*. Berlin, 1921, p. 69.
3. Manz. *Graefe-Saemisch Hdbch.*, 1876, 2, p. 98.
4. Ruhwandl. *Zeit. f. Aug.*, 1906, 15, p. 245.
5. Carreros-Arrago. *Cent. f. p. Aug.*, 1881, 5, p. 44.
6. Otto. *Beiträge zur Oph.*, 1893, 1, p. 369.
7. Lane. *Arch. of Oph.*, 1919, 48, p. 572.
8. Brückner. *A. J. O.*, 1907, 56, p. 1.
9. De Beck. *American Oph. Monographs*, 1890, No. 1, p. 65.
10. Nettleship. *R. L. Oph. Hosp. Rep.*, 1873, 7, p. 632.
11. Brailey. *R. L. Oph. Hosp. Rep.*, 1876, 7, p. 543.
12. Vassaux. *Arch. d'Oph.*, 1883, 3, p. 502.
13. Hess. *A. J. Oph.*, 1888, 34, iii, p. 148.
14. Grolman. *A. J. Oph.*, 1889, 35, iii, p. 187.
15. Dötsch. *A. J. Oph.*, 1899, 48, i, p. 59.
16. Ginsberg. *Ibid.*, p. 92.
17. Collins. *R. L. Oph. Hosp. Rep.*, 1893, 13, p. 21 and p. 361.
18. Parsons. *Trans. Oph. Soc. U. K.*, 1902, 22, p. 253.
- Parsons and Fleming. *Trans. Oph. Soc. U. K.*, 1903, 23, p. 242.
- Also *Pathology of the Eye*, New York, 1906, 3, part i, p. 859.
19. Salfner. *A. f. Oph.*, 1902, 54, p. 552.
20. De Vries. *A. f. Oph.*, 1904, 57, iii, p. 544. 6, p. 412.
21. Mittendorf. *Trans. Am. Oph. Soc.*, 1892.
22. Mittendorf. *Oph. Rec.*, 1906, 15, p. 489.
23. Gifford, H. *Oph. Rec.*, 1908, 17, p. 133.

OPAQUE NERVE FIBERS.

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The report of this case is interesting because accompanied by a color sketch showing the appearance of the fundus, and chart showing the limitation of the visual field.

I wish to report this case, not because it is met infrequently, but merely on account of being rather an extreme case where the entire disc is involved in the medullation of nerve fibers, the conducting power of the nerve fibers not impaired and vision practically normal.

In looking thru some of the litera-

ture on this subject, I find that the opaque nerve fibers usually occur at the upper and lower border of the papilla, sometimes surrounding the disc completely, the entire disc being involved considered an extreme case and uncommon.

While having an opportunity to study

fundi at various eye dispensaries and in one leading eye hospital for the past two years, I recollect seeing only very few cases of opaque nerve fibers, and none of them presented such extreme pictures as illustrated, where the entire disc is practically hidden and the retinal vessels embedded beneath, only to emerge a considerable distance from the disc.

Case: S. L.; female, age 23; occupation, optical worker. Her family and personal history are practically negative with the exception of a tonsillectomy two years ago.

Ocular history: was prescribed to wear glasses by an oculist about five years ago for the relief of headaches, but she never wore the glasses. Another oculist advised her to take muscle exercises for the internal recti with the pencil method; the latter was also neglected by patient. Her general health has been good, but lately she began to suffer from inflamed lids, burning sensation in her eyes and occasional headaches.

A careful physical examination by her physician proved negative.

Her ocular examination revealed the following: O²—both upper and lower lids are slightly inflamed. Palpebral and bulbar conjunctivae are moderately injected. Corneae are rather small but clear. Pupils—3mm. in diameter, react to direct, consensual light and accommodation. The ocular movements are full, but her convergence is weak. There is no evidence of lacrimal disease.

V. O. D.—six-sixths (6/6), near point O. D. 10 cm.

V. O. S.—six-sixths (6/6), near point —O. S. 11 1/2 cm.

The muscle balance showed orthophoria vertically and a very high degree of exophoria with the Prentice Cross method for distance and electric light from ophthalmoscope at 13 inches for near.

The power of adduction is very weak while the power of abduction is about normal. Her convergence near point 3 1/2 in.

Refraction under homatropin cycloplegia:

O. D. — .37 cyl. x 165 v. 6/5.

O. S. + .25 sph. + .25 cyl. x 90 v. 6/5.

Postcycloplegic refraction: Patient took the full amount.

Prism exercises were prescribed and constant wearing of glasses, besides tonics.

THE OPHTHALMOSCOPIC FINDINGS.

With undilated pupil, and later under cycloplegia with dilated pupils, showed: O.D.—media clear, disc hidden by grayish white fibers radiating up, down and to either side. The only parts visible are a few vessels: two small arteries and one vein emerging from the center of the disc, all seen thru a veil. The superior and inferior vessels appear about 1/4 disc diameter away from beneath the

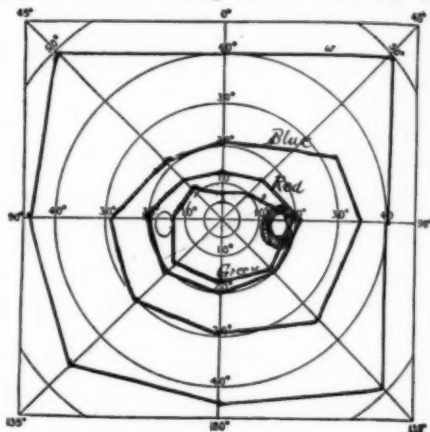


Fig. 1. Field of Vision, S. L., Opaque nerve fibers. Showing enlargement of blind spot. Taken by 5 mm. test object in daylight 3 p. m. of cloudy day.

opaque nerve fibers. The caliber, course, and walls of the vessels appeared to be normal. The macular and peripheral regions were negative. O.S. showed normal media, a well defined disc with sharply demarcated edges, healthy color, normal vessels, and no lesions were observed in the macula or periphery.

Medullation of the fibers of the optic nerve after leaving the lamina cribrosa is considered a conspicuous congenital anomaly. The sheaths encasing the axis cylinders of the optic nerve in the fiber layer of the retina give it a characteristic appearance, white and opaque. This abnormality is developed after birth, for the medullation of the fibers in the optic nerve itself is not completed until this period.

In many animals, e. g. rabbits, horses, the nerve fibers after traversing the lamina cribrosa regain their medullated appearance.

Since the medullated fibers are opaque, there is found in these places a brilliant white spot adjoining the edge of the papilla and splitting at its periphery into white fibers, so as to have a flame like look.

Medullated nerve fibers occur more frequently in one eye, the retinal vessels are hidden by the feathery fanshaped bluish white, glistening, radiating patch;

usually a distinct fibrillation and radiating striation can be perceived in the white area.

The indistinct border, the color, the striations, the behavior of the vessels and the absence of hemorrhages, edema, serve to distinguish this condition from conus, staphyloma, peripapillary atrophy and patches of exudation and degeneration.

BIBLIOGRAPHY.

- Frost, W. Adam. *Fundus Oculi*, 1901, p. 72.
 Collins and Mayou. *Pathology and Bacteriology*, p. 24, 1912.
 Adam. *Ophthalmoscopic Diagnosis*. Translation by Foster, pp. 48, 128.
 De Schweinitz. *Diseases of the Eye*. 1921.
 Roemer. *Textbook of Ophthalmology*. Translation by Foster, p. 746.
 Fuchs, *Textbook of Ophthalmology*, 6th American ed., pp. 39, 565.

LUPUS VULGARIS WITH OCULAR EXTENSION.

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SAN FRANCISCO, CALIFORNIA.

In this case the patient was treated for the condition at the age of thirteen, but returned nine years later for the involvement as shown in Fig. 1. The eye was enucleated and its microscopic examination showed tuberculous lesions, including the tubercle in the sclera. Presented at the meeting of the Eye Section of the San Francisco County Medical Society.

History resumé from records of the Department of Dermatology:

Agnes F., age 13 1/2 years, entered the University Hospital, August 24th,



Fig. 1. Showing destructive action of lupus on face and about right eye.

1913, having been referred from the country with a diagnosis of lupus vulgaris. Knowledge of English very limited. History not obtainable.

tivae and lids negative. Pupils equal, regular and react to light and accommodation. Teeth good; voice not hoarse. Ears negative. A few palpable glands in

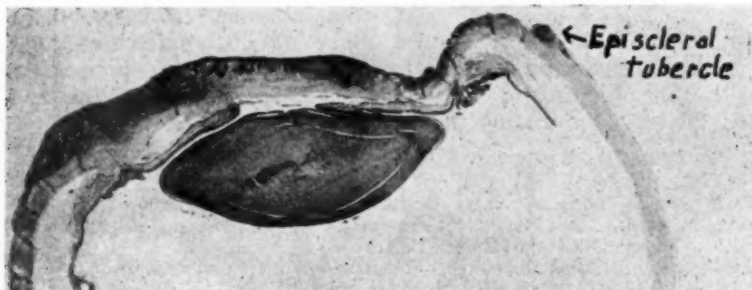


Fig. 2. Section thru anterior part of globe, with epidermoid epithelium, ulcerations at limbus, anterior synechiae and episcleral tubercle.

Examination. Large, stout girl, evidently of Mexican-Indian ancestry; swarthy; apparently of low mentality. Good natured, laughs a good deal; answers on command as far as her limited knowledge of English will permit. Face has a suggestion of Mongolism—eyes slightly slanted and cheek bones high. Hair very low on forehead. Face large in comparison to size of head. Conjunc-

tion of the neck. No epitrochlears. Lobes of thyroid not palpable. Isthmus seems only a very small cord.

Body: Short thorax, normal length from umbilicus to soles of feet. Heart and lungs negative, abdomen negative. Skin: large patch of lupus vulgaris over face; small patch on buttocks; skin over remainder of body not suggestive of myxedema, altho dry.

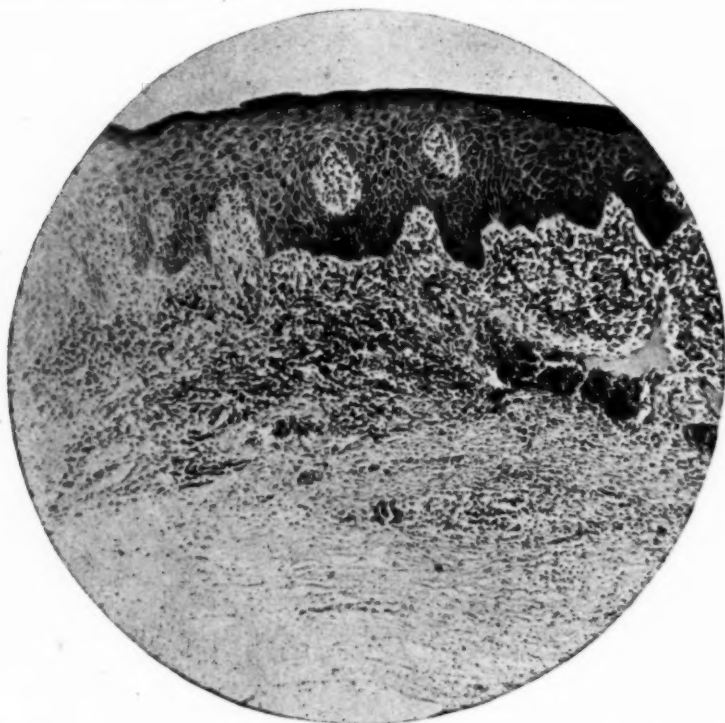


Fig. 3. Epidermoid corneal epithelium with corneal infiltrate. (High power.)

Patient does not conform to the classic lupus of hypothyroidism in Mongolism.

The lupus was treated at this entry and again in September and December of 1913. The condition was greatly improved and patient was instructed to return for further treatment in a few months, but failed to do so until March, 1922 (i. e., nine years later).

At this time there was a marked extension of the process involving a greater

bus on the temporal side was a large area of ulceration, with a smaller one on the nasal side. Details of anterior chamber and iris not visible. Because of the marked contracture of the bulbar conjunctiva, motion was limited in all directions.

Left eye: external examination and fundus negative.

Due to the amount of discharge, the cicatrization of the lids and the corneal

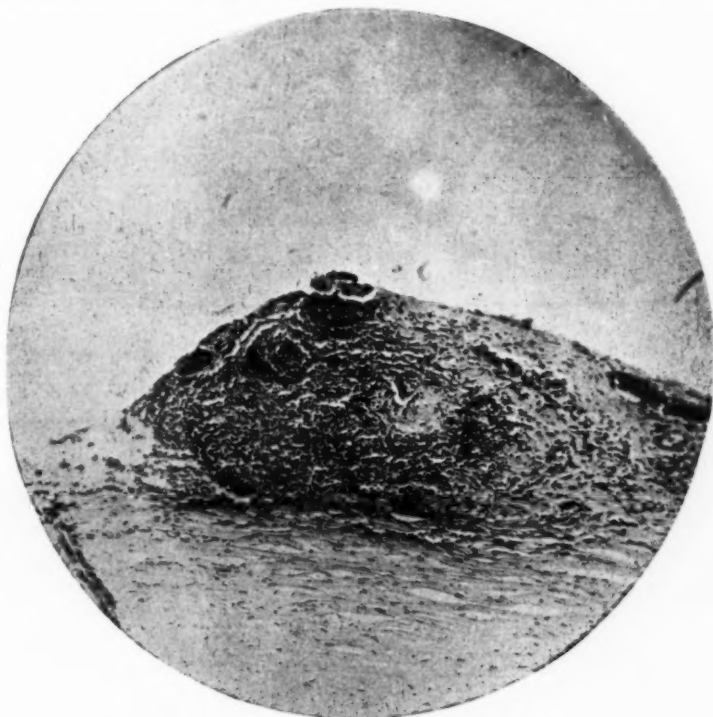


Fig. 4. Episcleral tubercle with giant cell.

portion of the face (Fig. 1). The general examination was negative except for slightly impaired resonance at the apices of the lungs. Breath sounds were rather harsh. No rales present. There was a mild daily rise of temperature. No tubercle bacilli in sputum.

The right eye showed a very marked cicatricial contracture of both the upper and lower lids, leaving the cornea entirely unprotected. On the conjunctiva were several areas of ulceration with granulation on one side and cicatrization on the other. There was a large amount of discharge present. The cornea showed marked applanation; its surface was opaque and parchment like. At the lim-

ulceration, the right eye was enucleated.

Microscopic examination showed the corneal epithelium modified with papillary projections into the parenchyma (Fig. 2 and 3), the epithelium having taken on dermal characteristics producing the so called epidermoid epithelium. There was a small round cell infiltration with rather marked vascularization thruout the cornea. At the limbus on one side was a large area of ulceration, composed of a round cell infiltrate with new formed connective tissue. The entire area was extremely vascular. On the opposite side of the limbus a smaller area of similar ulceration was seen. Near the center of the cornea a connective tissue plug ex-

tended from the iris partially thru the cornea, with the formation of anterior synechiae. In this connective tissue were numerous pigment cells, probably of iris derivation.

In the episcleral tissue was a nodule composed of round cell infiltrate, with epithelioid cells and a large well defined giant cell (Fig. 4 and 5). The sclera showed areas of round cell infiltration,

ing the tubercle bacillus. The clinical diagnosis is too well known to warrant its description here.

The disease process consists of a combination of epithelial proliferation with ulceration, granulation and cicatrization, affecting chiefly the corium, in which layer the nodules are formed. The nodules consist of cells which are clustered around the capillaries and

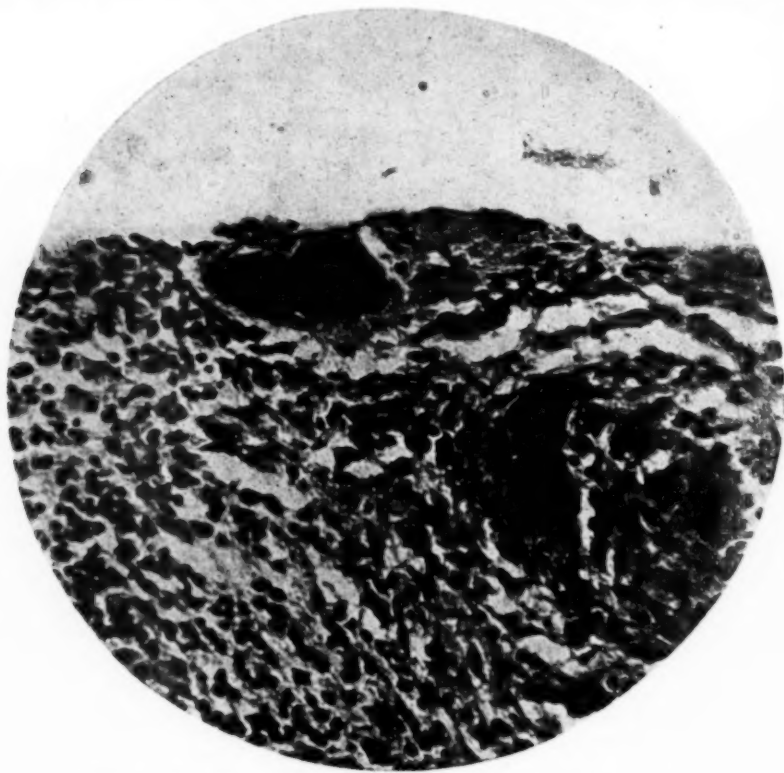


Fig. 5. Episcleral tubercle in area of giant cell. (High power.)

with one area that contained epithelioid cells and a giant cell (Fig. 6).

A low grade inflammatory process was present in the iris and ciliary body. The posterior segment of the eyeball was not remarkable.

The pathologic diagnosis was tuberculosis of the globe.

COMMENT.

Lupus vulgaris involving the dermal tissues, with invasion of the ocular structures, is so rare in America that very few cases have been reported. In Europe, however, the disease is seen rather frequently, the etiologic factor be-

lymph channels and show at their periphery layers of small round cells, beneath which are zones of larger epithelial cells. In the latter are large well developed giant cells, containing homogeneous centers and many peripherally arranged nuclei. Because of the interference with the circulation in the inner portion of the nodule, the centers deteriorate and undergo necrosis, followed by fatty degeneration and disintegration. Due to the distention, the epidermis ruptures and in this event it is followed by ulceration. In the epidermis, also, the rete proliferates and degenerates, and connective tissue forms between

the papillae, so that in a single specimen there may be equally well presented both the advance of the disease and its cicatrization.

After lupus of the face has existed for a long time, there may be an invasion, a direct extension to the lids and in marked cases even the globe itself may be involved. Fortunately, when the spreading disease encroaches upon the eye, the

bacilli. Some of these ulcers have steep swollen edges surrounded by very vascular granulation tissue. Other cases have been described, (Burnett¹ and Reiman²), in which there was extensive cicatrization and shrinking suggestive of pemphigus. According to Bach³, Denig⁴, Grunert⁵, Birch-Hirschfeld⁶ and others, the lupus cases are doubtless due to transference of infection, lupus of the

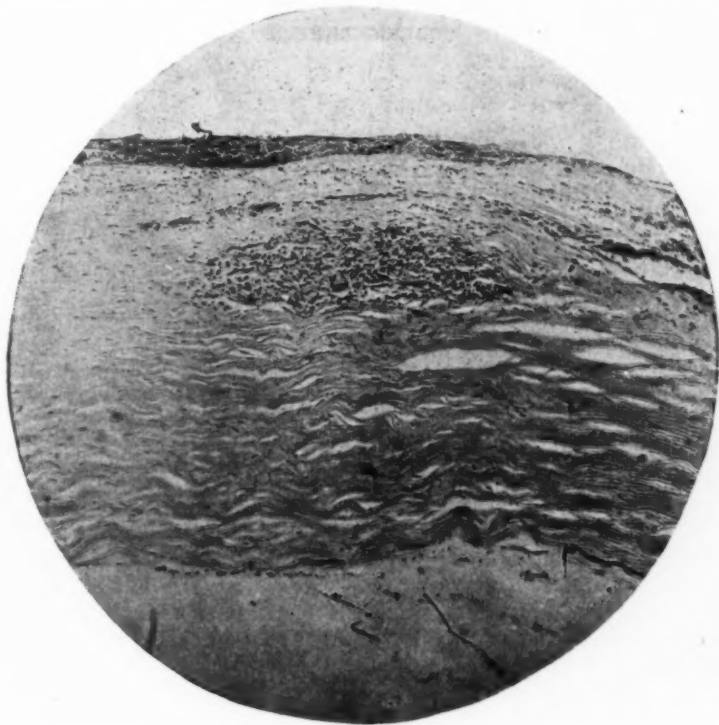


Fig. 6. Scleral tubercle.

cicatricial formations which ensue, as a rule, distort only the eyelid and produce moderate ectropion.

When the lids are affected, the process may pass from them to the conjunctival surfaces and extend to the eyeball. The globe itself may be seriously affected at the limbus, so that region offers a favorable site for the extensive developments of lupus. In addition to the encroachment upon the conjunctiva by the patches of the face, there may be a direct extension from the lacrimal duct. In these situations it is manifested as ulcerated surfaces, the bottoms of which are covered by granulations, in the substance of which may be found the tubercle

face, nose or larynx being usual concomitants. Fuchs states that tuberculosis of the conjunctiva and lupus are the same condition.

The case in hand is of interest because of the severity of the disease and its marked destructive action on the lids and globe. At the limbus was the typical ulceration with the marked granulation tissue present. The epidermoid formation of the corneal epithelium is also noteworthy and rather unusual. Parsons⁷ states that after prolonged exposure, the epithelium becomes epidermoid in type, exactly resembling that of skin.

This follows in the cicatricial degeneration of the conjunctiva observed most frequently as the final outcome of trachoma and also, but more rarely, after diphtheria, pemphigus, burns, etc. It is again seen where there is deficient sheltering of the cornea, as in ectropion and in lagophthalmos. We find it also in xerosis, referring by that term to the general disease. The tubercle in the sclera is unusual. It is doubt-

ful, according to Parsons⁸, whether primary tubercle of the sclera exists. It is frequently invaded secondarily to the uveal tract. In this case the uveal tract was negative, so that the secondary invasion must have been from the conjunctival process.

One can assume that, had the patient returned for further treatment in 1914 as instructed, the marked destructive action could have been avoided.

BIBLIOGRAPHY.

1. Burnett. A. of O., xix, 1890.
2. Reiman. K. M. f. A., xxxvii, 1900.
3. Bach. A. f. A., xxviii, 1894.
4. Denig. A. f. A., xxxi, 1895.
5. Grunert. A. f. A., xxxiv, 1897.
6. Birch-Hirschfeld. K. M. f. A., xxxvii, 1900.
7. Parsons. Path of the Eye, V. 1, p. 228.
8. Parsons. Path. of the Eye, V. 1, p. 278.

HYOSCIN IDIOSYNCRASY.

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In patients with an idiosyncrasy to atropin, hyoscin has been used without untoward effect. But in the case here reported, it was almost fatal, causing coma and shallow laborious breathing. A series of cases found in the literature are cited.

It has been known and admitted that hyoscin as we use it in ophthalmic practice is a mydriatic five times as powerful¹ as atropin, but the apprehensions following its use are such that it has earned the respect of many ophthalmologists, so that its employment is becoming more and more obsolete. Still, in all, we have used hyoscin in patients that had marked atropin idiosyncrasy without any unusual results. A case that is recalled particularly was that of a girl twelve years of age, that had an interstitial keratitis of tuberculous origin and manifested severe evidences of belladonna poisoning whenever atropin was used, but who had been under a one per cent of hyoscin solution three times daily for eighteen months without any untoward effect. Reber² has used a 1/10% solution of hyoscin hydrobromat, containing also 1/5% cocain, in two thousand refractive cases, and with much satisfaction. In about one case in fifty, there was rather marked flushing of the face, quickening of the pulse and some slight vertigo, but no more than was sometimes seen with homatropin. Not once was pronounced toxemia noted.

Despite the above it is desired to cite the following case report, where the patient manifested atropin idiosyncrasy and hyoscin was used with an almost fatal termination.

Miss A. D., aet 40, an artist by profession, was referred to me by Dr. M. on July 1, 1922, complaining of pain, photophobia and lachrimation of the right eye. She had had this only a day, and the vision in that eye was 20/50 and in the left 20/20. Examination revealed no conjunctival discharge. The cornea was clear and translucent and there was fine pericorneal congestion. The pupil was smaller than the left and reacted sluggishly. There was also a muddy appearance to the iris and no spots were noted on Descemet's. She had marked ciliary tenderness on pressure, and the tension to finger palpation was increased. The vitreous was apparently clear and the fundus thru an undilated pupil was normal altho somewhat hazy. The left eye was normal. A diagnosis of either plastic or autotoxic iritis was followed by advice to the patient as to treatment, which consisted of hot bathings, instillation of atropin sulphat 1%

solution every four hours, and the rest of the routine as outlined by de Schweinitz.³ The next day the pupil being irregularly dilated as a result of the synechiae, atropin sulphat 3% solution was instilled with pressure on the canaliculus immediately following the instillation.⁴ On the fourth day the pupil was well dilated, there was less pain and photophobia and the tension felt normal or less. On the sixth day the patient said that she felt well as far as her eyes were concerned, but was very nervous, had palpitation of the heart and a marked dryness in her throat. Our assumption was then, that she had had all the atropin she could tolerate, but as there still was a circumciliary and pericorneal zone of congestion, some haziness of cornea, tenderness and a few fine spots on Descemet's, it was felt that mydriasis was still a desired factor. However, we waited that day and the next; discontinued the atropin and instructed her to keep up the hot bathings at more frequent intervals, with the result that we began to have a return of her objective symptoms. The question of a substitute for the atropin suggested either hyoscin or scopolamin. The former was used as one of election, using a 1 to 1,000 solution with instructions to use one drop in the right eye three times daily. A 1 to 1,000 solution was used, altho Fortescue-Brickdale⁵ in his monograph on hyoscin and the mydriatic alkaloids advocates 1 to 250 solution as a mydriatic. Meijer⁶ also states that weaker doses should be given to women than men, and increase in dosage should be gradual and cautious, while Cushny pointed out that it was a comparatively safe drug to use, because it was rapidly excreted or destroyed in the tissues.⁷

To return: her sister instilled the first drop at about noon and then went down stairs to prepare some lunch. She returned about half an hour later and found the patient lying on the floor, unable to be aroused, with shallow but very laborious breathing and very widely dilated pupils. The family physician responded to a call within ten minutes and found the patient still in coma, pupils widely dilated, slow but very labored breathing and both sternocleidomastoid muscles very tense and rigid. The sister

of the patient told the doctor that hyoscin was prescribed to replace the atropin that she had shown an idiosyncrasy to, and a diagnosis of hyoscin poisoning was readily made. She was given four injections of pilocarpin at hourly intervals and following the last injection began to recover consciousness. An hour later she fell asleep and awakened a few hours later feeling perfectly well, but with a decided amnesia as to what had happened. The peculiar instance in this case was that atropin 1% solution was again resorted to and carefully watched, and the iritis promptly cleared up. She has been watched carefully since that time and no ocular or general manifestation has been noted since.

The liberty was taken to cite the above case because in perusing the literature so little has been written on the subject. Cases of poisoning are recorded, but chiefly in cases which took large doses by mouth thru some mistake. However, Pooley⁸ noted two cases in adult women and one case in a girl of thirteen, in which six instillations of a 0.2% solution of hyoscin hydrobromid into the conjunctival sac produced a staggering gait, dry throat, rapid irregular pulse (120), a sensation of "pins and needles" in the soles of the feet, and spasmodic contractions of certain facial muscles. Sharp⁹, in an experiment upon himself, found that 1/100 grains instilled into the eye caused first quickening, then slowing of the pulse, which was full and bounding in character, throbbing of the temples, dryness of the mouth, blurring of vision with dilated pupils and staggering gait. Later there was flushing of the face, some mental confusion and somnolence. These symptoms disappeared in twelve hours. Morton's¹⁰ case was one in which grs. 1/25th was instilled into the eye. In five minutes there was giddiness, dry mouth, staggering gait and mental confusion. The patient gradually became unconscious and there was complete relaxation, flushed face, slow breathing and full regular pulse. This condition lasted a few hours, and was succeeded by a cheerful delirium in which the patient, tho at times irritable, laughed a good deal. Recovery here also was complete with amnesia

Comment: Most men in the above cited case would probably have used scopolamin instead of hyoscin, but as the two are identical chemically and physiologically¹¹, it is wondered whether the same results would not have prevailed. It was a remarkable fact that the instillation of only a single

drop of such a comparatively weak solution of hyoscin should have caused such severe reaction as cited above, and we can only assume that the employment of this drug in ophthalmologic use should probably be discouraged or at most used with extreme caution.

LITERATURE.

1. Amer. Encyclo. and Dictionary of Ophthal., 1916, viii, 609.
2. Reber. Practical Medicine Series, Eye, 1909, 18.
3. De Schweinitz. Diseases of the Eye, 1922, 334.
4. Reber. Ibid.
5. Fortescue-Brickdale, J. M. Brit. Med. Chirurg. J., 1910, xxviii, 317.
6. Meijer. Schmidt's Jahrbuch., 1900, 269, 222.
7. Cushny. (Pharmacology, 1906, 290.
8. Pooley. Canadian Lancet, Jan., 1895.
9. Sharp. British Med. Jour., 1895, ii, 1547.
10. Morton. British Med. Jour., 1896, ii, 336.
11. De Schweinitz. Diseases of the Eye, 1921, 124.

NOTES, CASES, INSTRUMENTS

TREATMENT OF PROLAPSE OF IRIS FOLLOWING CATARACT EXTRACTION.

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Prolapse of the iris may occur during or after operation. In the former the iris may be replaced by the spatula and stay in position within the anterior chamber. Indeed, the replacement of the iris or the so-called toilet of the wound, is the final step of all cataract extraction operations. But replacement is not always possible, complete or permanent. For example, in the case of a patient who persists in turning his eye upward, when introduction of the spatula would almost necessarily rupture the hyaloid membrane with loss of vitreous; or in case of gaping of the wound, in spite of all precautions further manipulation would lead to disaster; or when the patient is inclined to squeeze the lids together, or for any other reason, the eye should be closed and the operation concluded.

Prolapse may result from accident within a few days after operation. Thus, during the dressing, before the wound has entirely or firmly closed, the escaping aqueous may carry the iris into the wound; or by strongly squeezing the lids, the aqueous is

forced out with a gush and the iris is prolapsed. It seems impossible to guard against all accidents during convalescence, however great the care and skill, by which the wound is reopened and the iris prolapsed. The practical question confronting all operations is what is to be done, not in prevention but in cure.

1. Prolapse before operation is completed and the iris cannot be replaced.

2. Prolapse after operation.

1. In the case of punctured wound of the cornea (limbus) with prolapse; the treatment recommended is to replace the iris if possible; and if it cannot be done, to draw the iris free from the wound and to excise it (iridectomy) and then cover the wound with a conjunctival flap. This plan cannot be followed in cataract extraction. We are compelled, if our efforts to replace the iris are unsuccessful, to allow it to remain to be dealt with later. To excise at this time and to cover the incision with a flap is impracticable. The making of a large flap before making the corneal incision, as advocated by Stanculeanu and by Barraquer, could not prevent the prolapse but might limit its extension. But the method has few advocates. It introduces an unnecessary complication and prolongs the operation.

2. We will assume that the wound has healed, that the pupil is not drawn up toward the cut and that the prolapsed iris is covered by conjunctiva and exudation. Should this iris containing cyst be allowed to remain, or should the attempt be made to excise it and to close the wound? The various operations for the extraction of cataracts are subjects of everlasting interest, and many hundreds of pages of literature are given over to it each year, yet if one looks for a discussion on the phase under consideration one is disappointed. The summary of text book advice is to either allow the prolapse to remain undisturbed or to cut it off. One's own experience seems to be the best guide. I confess frankly that dismay enters my soul at the thought of replacement or excision the day after extraction. If the wound is closed it will be reopened; if not closed, loss of vitreous and infection are dangerously near and replacement, even if successfully made, will be of doubtful efficacy because of the probability of another prolapse. Unless the prolapse is very large, and this is exceptional, my treatment is a weak solution of eserine and a pressure bandage, with the pressure uniformly distributed over the eye by small wads of cotton underneath the bandage.

The late treatment must depend upon the behavior of the prolapse or cyst enclosing the prolapsed iris, and the state of the eye itself. Naturally when the cyst does not increase in size, vision fairly good and the eye free from irritation, no operation is indicated. When, however, the cyst is growing, which means that danger to the integrity of the eye is also increasing from rupture of the cyst, infection and closure of the pupil, further delay of radical measures is reprehensible. We have, theoretically, the choice of one of two procedures, namely, conjunctival flap or incarcerated iris. For example, a mature senile cataract was extracted in the case of a woman, 67 years of age, without accident. The wound remained open for four weeks and there was a slight prolapse of iris. A conjunctival flap to cover the entire incision was made at the end of four

weeks. It did not bring about healing. In a few days a second flap was made and was successful. The patient's stay in the hospital was prolonged to seven weeks, she was kept perfectly quiet in bed and was given strychnia and nourishing food. Its uselessness in prolapsed iris is shown in the following case: A woman of 61 had about 24 D of myopia; vision declined to perception of moving objects because of an opaque lens. Light projection good. Preliminary iridectomy; six weeks later the left lens was extracted without accident. One hour before operation she was given 1/4 gr. morphia sulphat hypodermically, and ten minutes before operation the orbicularis was paralyzed by subcutaneous injection of novocain (Van Lint). The operation was smooth and painless. The following day the ciliary margin of the upper lid was entangled in the wound, owing to paralysis of the orbicularis. The wound healed slowly inclosing in its entire length, the iris. At the temporal end the prolapse was barely more than incarceration; as its median end, a cyst of considerable size and portent had formed which, as the days went by, slowly increased. A conjunctival flap failed to control its advance or even to cicatrize the wound. Finally the iris cyst was excised, the edges of the wound gently scraped to freshen its surface and a scleral suture introduced. To avoid pressure upon the globe a double needled suture was used. One needle was passed thru the scleral lip, the second thru the corneal lip from within outwards. The suture was effective. The patient eventually had vision of 20/70.

The conclusions deduced from these and similar cases are: 1. To avoid surgical interference immediately after the extraction. 2. To allow small stationary prolapse cysts to remain undisturbed. 3. Cysts increasing in size, however gradually, should be cut off, the surface edges of the original incision freshened and brought together by a double needled suture, the needles introduced from within outward. 4. The conjunctival flap is practically worthless.

LENS INJURY WITHOUT RESULTING CATARACT.

C. L. LARUE, M.D.

BOULDER, COLORADO.

This case is of importance and probably should be on record, in that a piece of steel pierced the crystalline lens near its center without causing a cataract leaving the patient with normal vision.

On February 27, 1922, patient, J. O. H., male, age 35 years, was struck in the left eye with a piece of steel while working under an automobile. There was no pain or discomfort at the time and it was only on the following day, that some redness and discomfort caused the patient to come to the office for examination. At that time there appeared near the center of the cornea a small opacity, and almost beneath this opacity a small hole in the iris adjacent to the sphincter. In this same straight line there was a small cloudy streak extending entirely thru the lens, and just back of the posterior lens capsule, in the vitreous, could be seen on careful examination a small foreign body. Patient's vision in this eye was 6/7.5 and J. No. 2. Diagnosis of foreign body in the vitreous was made and patient prepared to have same removed with giant magnet.

On finding that the magnet was out of order, patient was on the following day referred to Dr. Finnoff, who verified the above findings, except that he was not sure of being able to see the foreign body in the vitreous. It was assumed possible that it had jarred downward and was lower than at first. Localization X-ray showed, according to Dr. Finnoff's report, that the vitreous at that time contained a foreign body 10 mm. below the horizontal plane of the cornea, 2 mm. to the nasal side of the vertical plane and slightly back of the posterior lens capsule. This was extracted thru a scleral incision by the giant magnet and was found to be a piece of steel measuring $1\frac{1}{2} \times 1\frac{1}{2} \times 1\frac{1}{2}$ mm.

The patient was shown at the Colorado Ophthalmological Society (see v. 5, p. 471); and was treated for

several weeks with atropin and dionin, and there was at no time, (altho he was closely and frequently observed), any signs of cataract.

April 18, 1923. (14 months after injury.) Patient comes to the office at our request and states that his vision is as good as ever, and that he has had no further trouble with his eye. There is now in the left eye a deep linear corneal opacity, $1\frac{1}{2}$ mm. long, slightly above the horizontal plane and slightly to the nasal side of the vertical plane. Corresponding to this in the iris is a small hole, adjacent to the sphincter, about 1 mm. in diameter. This hole is slightly outward and downward from the scar in the cornea. In the lens there is discernible on close examination, with a well illuminated ophthalmoscope, a faint milk like suggestion of a linear opacity in the same straight line with the corneal opacity and iridotomy. This extends completely thru the lens and marks dimly the pathway the foreign body traveled. It is indeed so dim that it is not discernible on first examination. The vitreous is negative.

This case is of interest in that a piece of steel passed completely thru the lens without causing cataract or permanent injury to the vitreous. This has happened many times, but usually the foreign body passes near the periphery, while in this case its pathway was not far from the center, which makes the case somewhat unusual.

COMPLETE CONGENITAL CATARACT, BILATERAL.

WALTER E. SCARBOROUGH, M.D.

ALBUQUERQUE, N. M.

Fuchs, in his Text-book of Ophthalmology, states that, "Congenital Cataract is quite a frequent condition. Of 3,300 cases of partial or complete blindness in children investigated by Hartman, 284 were due to congenital anomalies of the lens," and calls attention to its hereditary aspect. In this case reported, while there is a history on both sides of the family of disturbances of the eye, there is a history of cataract only in one, the father's father.

This case, Baby P, 7 months of age, from Socorro, N. M., of Spanish extraction, referred by and seen in conjunction with Dr. F. C. Bakes of this city, presents some unusual features, interesting not only in the eye itself, but in the parental history as well: It would be well to state that in the Spanish race we find abnormal conditions of the eye a common disorder; more especially do we find senile cataract in this race.

The baby presents on examination, a condition of malnutrition: We find a breast fed baby of ten pound weight; somewhat emaciated, general lymphatic enlargement, especially of inguinal glands; axillary and cervical enlarged, tho less than the inguinal. In the skin is an irregular, reddish, macular eruption covering the chest, abdomen and face. White spots were noticed in each eye about one month ago, by a neighbor; and the parents state they had always been there, but not so large or white.

Eye examination shows a somewhat sunken eye: T. N. Pupils react sluggishly and very little; conjunctiva and cornea clear; iris shows no changes; complete opacity of both lens, which completely occludes the pupils. No light perception in either eye so far as can be ascertained; impossible to observe fundus with ophthalmoscope. Nose, throat and ear negative.

Mother: age 35—Six children born, one died of diphtheria. Has had two miscarriages, first one before birth of first child, at three months gestation; second miscarriage after birth of fourth child at same period of gestation. Has had eye trouble for twenty years; vision corrected with glasses for that period; has one sister, one brother and an uncle who have convergent strabismus; no cataract in the family. Urinalysis shows sp. gr. 1025, trace of albumin, otherwise negative. Blood Wassermann negative.

Father's father died at 70 after having been blind for five years with bilateral cataract; no other eye history.

Owing to the poorly nourished condition of the child at this time, needling will not be attempted; but if possible to bring about an improved

condition of the baby's health by 10 months of age, a dissection will be done. Regardless of a negative blood Wassermann, antisyphilitic treatment is being instituted in the mother.

Regardless of the frequency with which Fuchs states anomalies of the lens cause blindness in children, it has never before been my fortune to observe such a case, and it is therefore presented for your consideration.

PAINLESS CHALAZION OPERATION.

WILLIAM T. DAVIS, M.D.

WASHINGTON, D. C.

Read before the section of Ophthalmology of the District of Columbia Medical Society, January 19th, 1923.

One is impressed with the fact that chalazion operations are very painful, and that local analgesia is insufficient as commonly used. Believing it is the duty, and should be the endeavor of the surgeon, not only to alleviate suffering but conscientiously to refrain from inflicting it, the following technic has been evolved.

The eye being prepared for operation, local anesthesia of the conjunctiva is secured by instilling holocain solution 1% three times, at five minute intervals, followed by cocain solution 4% twice, at five minute intervals. Adrenalin solution 1/1000 is used with each instillation of the cocain drops, as an adjuvant to the cocain and as a preventive of hemorrhage.

Immediately following the first cocain instillation, the lid is injected *thru the skin* with novocain solution. At the point of entrance of the hypodermic needle the skin is touched with tinctur of iodine; the needle is then pushed beneath the loose skin of the lid into the subcutaneous tissue well beyond the edge of the tumor; as the needle is withdrawn the solution is injected, about one-fourth to one-half c.c. being used, the lid is then lightly massaged. Three minutes after the last cocain instillation the operation is done.

The novocain suprarenin tablets "E" (Metz) are used, containing of novocain 0.02 grams and suprarenin 0.00005

grams, one of these tablets being dissolved in 10 c.c. of sterile water.

The operation usually done is the radical one; in which, after the chalazion forceps have been placed in position, a crucial incision is made with a *sharp* knife. The corners formed by the incision are cut off, this effectually removes the whole of the top of the tumor or cyst wall; the usual curettage is then done.

The patient is caused to lie down while the operation is being done, and is kept in this position for ten or fifteen minutes while the eye is cleared of blood and a few drops of adrenalin instilled to prevent further hemorrhage. The patient is instructed to use hot fomentations that day and the next as a preventive of soreness and swelling. He is required to present himself for examination the following day and, if all is well, is then discharged with

instruction to again report for examination should any discomfort arise.

In those cases where this procedure is carried out there has been no pain in even the deepest forms of chalazion. It is essential that the proper time be allowed for the conjunctival anesthesia and the novocain injection to take full effect. The synchronism in putting in the drops is likewise necessary, if the full effect is desired.

A CHALAZIOTOME FOR REMOVAL OF MEIBOMIAN CYST.

J. MONROE THORINGTON, A.M., M.D.

PHILADELPHIA, PA.

One of the most common of ophthalmic operations is for the removal of chalazion or Meibomian cyst. The operation consists in incision, removal of the cyst contents, thoro curettage and, if possible, excision of a portion of the

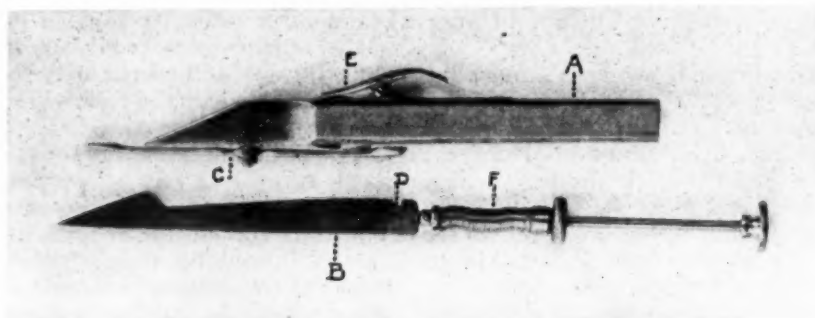


Fig. 1. Chalaziotome, showing details of construction.

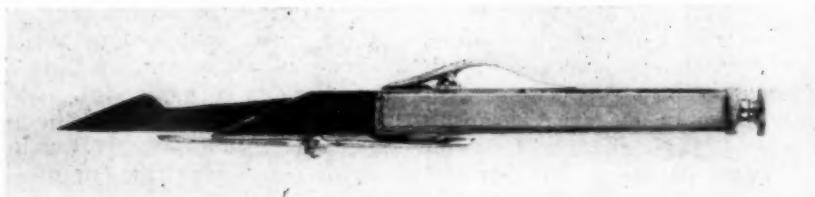


Fig. 2. Chalaziotome assembled; scalpel in position for incision.



Fig. 3. Chalaziotome with scalpel released and retracted, bringing curette into position for use.

sac wall. Due to the relative impermeability of the sac wall to local anesthetics, the operation is often attended by some pain. It is obvious, therefore, that any technic which hastens the completion of the operation is of value.

The instruments required for the usual operative technic are a lid clamp, to fix the cyst and to protect the eyeball, forceps, a small knife, and a curette of suitable size. When doing the operation without assistance, as is frequently the case, it is desirable to use few instruments, as a large number complicate the procedure and lengthen the operative time.

The writer has devised an instrument which combines a Beer's knife and a curette, which, when used with lid clamp and forceps, allows the operation to be speedily completed without the necessity of picking up or transferring any instrument after the operative procedure is once under way.

The instrument consists in a hollow barrel (A), in which is inserted a piston-knife (B). Near the tip of the barrel there is attached a pivot with a rotating arm (C), on each end of which is placed a suitable curette. The two curettes differ in size and either may be rotated into operative position. When the piston knife is placed in the barrel, a notch in the blade shaft (D) engages with a release trigger on the barrel (E). In this position, the blade extends well in advance of the curette, and a retracting spring (F) is placed under tension. The instrument is now ready for operative use.

The lid clamp is placed in position, the chalazion held by forceps, and incision made. The release trigger is pressed by the index finger of the operating hand and the knife retracts, exposing the curette which can be immediately brought into action. If the knife is required further, the piston tip is pressed until the scalpel is again in position and the trigger engages.

While the explanation is necessarily complex, the action of the instrument is simple and rapid. Following incision, the curette is within the sac before the patient could possibly pull

away. The instrument may be sterilized in alcohol or the blade removed and the barrel boiled.

NEURORETINITIS RESEMBLING RETINITIS PIGMENTOSA PROBABLY DUE TO CON- GENITAL SYPHILIS.

A. C. LEWIS, M.D.

MEMPHIS, TENN.

Read before the Memphis Society of Ophthalmology and Oto-Laryngology.

Mr. S. D., white, a farmer aged 33, was sent to me on Dec. 13, 1922.

His history was: No blindness or eye disease in parents or ancestors on either side of the family. Four brothers died in infancy, has no knowledge of their eye condition. The only other child, (a sister) was as blind as he is, and died a few years ago in early adult life. No consanguineous marriages in his family.

On examination: Eyes appeared normal externally except for horizontal nystagmus, which was quite marked. Pupils regular, normal size and react to light very slightly. Vision:—O. U. moving objects in good light at 10 feet, brought to 1/20 in left eye with plus 2.50 sph. Right eye unimproved by lenses.

Ophthalmoscopy shows all media clear. The fundus of each eye shows marked degenerative changes quite similar in appearance in both. The nerveheads are pale and shrunken thruout, the temporal sides being most affected. The retinal vessels are very small and threadlike, and disappear entirely as they approach the periphery. The retina shows marked degenerative changes thruout. Numerous large spots of pigment are seen in all parts of the retina. These are apparently superficial and confined to the retina. Their size, shape, and arrangement are not such as are characteristic of retinitis pigmentosa, but the condition resembles it in many other respects. There was no history of nightblindness, but his vision has been so bad at all times that he was unable to tell about this.

Laboratory reports gave a negative

urinalysis and a four plus blood Wassermann. In the past two months he has received eight doses of salvarsan. The nystagmus shows considerable

improvement but no visible changes are seen in the grounds, nor is there any demonstrable improvement in his vision.

SOCIETY PROCEEDINGS

Reports for this department should be sent at the earliest date practicable to Dr. Harry S. Gradle, 22 E. Washington St., Chicago, Illinois. These reports should present briefly scientific papers and discussions, include date of the meeting and should be signed by the Reporter or Secretary. Complete papers should not be included in such reports; but should be promptly sent to the Editor, as read before the Society.

OPHTHALMOLOGICAL SOCIETY OF THE UNITED KINGDOM.

ANNUAL CONGRESS, 1923

London, April 26-29.

President, DR. A. MAITLAND RAMSAY,
of Glasgow.

Debt of General Medicine to Ophthalmology.

THE PRESIDENT delivered his inaugural address on this subject. He said it was easier for most men to trust in authority than to exercise independent judgment, but the trend of modern progress was to appeal less and less to authority. Specialism was the natural sequel of increase in knowledge, and it should be symbolic of the highest form of efficiency. The tissues of the eye were so delicate, its structure so complicated, its diseases so numerous and so frequently followed by disastrous results, that it was no matter for wonderment that oculists had existed from time immemorial, though in quite early days their claim to practice the specialty was very poor, as they had not acquired the general principles of medicine and surgery.

The specialist in medicine must combine the diagnostic skill of the physician with the dexterity of the surgeon, and add that special knowledge which gave him power to reach further. It should be the aim of every specialist, by reading and frequent visits to a general hospital, to keep in touch with medicine, at least along its most important lines of advance. But there should be no hurry, as that might lead to specialization too early, to the cultivation of one department to the exclusion of others. The study of

ophthalmology constituted the best discipline in exact observation in the whole medical curriculum. It was, indeed, an education in itself, for absolute precision was of the first importance. It was a great aid, too, to a methodical investigation of diseases of the nervous system. Such a purely ocular condition as optic atrophy, ocular palsy, or loss of the pupillary light reflex might lead to the diagnosis of tabes dorsalis. One patient he saw had been blind from optic atrophy twenty years before the onset of the more widespread manifestations of disease of the spinal cord. Likewise the study gave decisive evidence of disease of brain or kidneys. Homonymous hemianopsia might be the only proof remaining of a past cerebral hemorrhage, and its recognition where paresis had been slight and transient would prevent the physician falling into error, either in regard to diagnosis or prognosis.

On account of the transparency of its structures, the eye had always been the hunting ground of the pathologist; pathologic changes usually hidden from view could be seen and watched in the eye from day to day.

For some years he had been working with Sir James Mackenzie to whose teaching he owed a great deal of inspiration. He had been struck by the similarity of action of ciliary muscle and cardiac muscle. In both, the limits of muscular capacity must be respected, and the amount of work to be done should be adjusted accordingly. Of all the unstriped muscles in the body, it was only the ciliary muscle and the cardiac muscle which could be forced by the will to continue working long

after Nature had called for rest, and the former of these was active all thru the waking hours, and the latter was incessant. The reserve power of both became less as age advanced. Loss of power in the eye could be measured and glasses prescribed accordingly; but in the case of the heart which was using up its reserve all that could be done was to limit its work in accordance with its capacity.

The power of accommodation could be regarded as a fair index to the general health. In emmetropes who were robust, the need for spectacles could be delayed beyond the usual age, just as the heart of some elderly people permitted them to play strenuous games; but in them the rapid onset of presbyopia was always a sign of failing health, and that the person was not likely to live much longer. Adults often complained of their eyes after influenza, and children often suffered from their eyes for the first time after measles or scarlet fever; in fact sight was quickly affected in all disorders of the body. Inability to use the eyes for close work on account of excessive pain, with hyperalgesia of the skin of the scalp, were symptoms in every way comparable with those present in angina pectoris. The acute symptoms might not be manifest until some hours after the causal effort.

In conclusion, he said the gain to scientific medicine would indeed be great when the ophthalmologist cooperated closely with the family doctor, and kept himself informed of the subsequent medical history of patients who had consulted him on account of failing sight; and when, on the other hand, the general practitioner brought his medical knowledge, experience and common sense to bear on all the ophthalmologic problems with which he might be confronted in his work.

Etiology of Angioid Streaks in the Fundus.

MR. E. TREACHER COLLINS read a paper on this subject. He said a comparison of the arrangement of these streaks in the different recorded cases showed that they presented certain common characteristics, which could only be accounted for by there being some

anatomic factor upon which their distribution depended. Their arrangement, he showed, corresponded closely to that of the circle of Zinn of the short posterior ciliary arteries around the optic disc, and of the main branches proceeding from it. Ophthalmoscopic observations by several different writers showed the undoubted hemorrhagic origin of these streaks. The hemorrhages from which they had been seen to arise were never situated in front of the retinal vessels, nor were they flame shaped like retinal hemorrhages, but presented the characteristics of subchoroidal or intrachoroidal hemorrhages. Blood effused between the choroid and sclerotic, due to its slow absorption, would like blood stagnant in other parts of the body, tend to give rise to insoluble crystals of hematoidin and hemosiderin. These, if deposited in the perivascular spaces around the branches of the short ciliary arteries, would account for their pigmented appearance when viewed ophthalmoscopically.

The other fundus changes commonly met with in association with angioid streaks, such as haze or pigmentation of the retina, various degrees of atrophy of the choroid, etc., were also, he said, adequately explained as the outcome of subchoroidal hemorrhage. There was not yet sufficient evidence as to why patients suffering from this affection should have choroidal hemorrhages.

Cataract Extraction by Barraquer's Method.

MR. R. AFFLECK GREEVES and MR. R. FOSTER MOORE read papers on this subject.

MR. GREEVES' contribution was based on 49 patients from whom he removed, or attempted to remove, the lenses by Barraquer's method. In two cases he removed the lens from each eye, making the total number of lenses 51. The cases he divided into three groups. In group 1, 31 cases, the lens was successfully extracted in its capsule. In group 2, 7 cases, the capsule broke during the operation, but he was able to extract the greater part of the lens substance with the suction instrument, the capsule left behind being subsequently needled in the usual way. In the third group, 13 cases, the lens could not be

delivered by the suction instrument, and the use of the scoop was necessary.

The cases in the second group mostly ran the same course as those after extraction by the old method, and in each case the secondary cataract was needed. In one, needling was a failure, and he proposed to perform iridotomy.

In all the 13 cases in the third group a scoop was used. In the majority, very little vitreous was lost, and on the whole he did not regard the visual results as unsatisfactory. The smallness of the vitreous loss was probably due to the lens being already dislocated forwards. In one case the cataract was hypermature and the zonule weak. If a complete iridectomy had been done, the corner of the coloboma might become caught in the edge of the cup and prevent extraction. Another possible reason was the giving way of the lens capsule after the lens was dislocated. A further cause for failure was an unknown variability in the negative pressure obtainable, due to the changes in strength of the electrical current which actuated the motor. He entered into the technic of the operation, and gave particulars of each of the 51 lenses treated.

In conclusion, he said his view was that the result of a successful intracapsular extraction by this method left nothing to be desired. The pupil was black and free of membrane, the media were clear, the visual acuity was excellent, and there was no undue amount of astigmatism. On the other hand, however, the method had shown itself to be less certain in its results than extraction without the capsule.

MR. R. FOSTER MOORE'S paper was based on 38 cases; he had excluded 6 in which he operated with an improved method of producing the vacuum before the Barraquer apparatus was available. Concurrently with doing this operation at Moorfields, he had been, at St. Bartholomew's Hospital and in private, carrying out the extracapsular method; and this enabled him to better judge of the respective merits of the procedures.

He described a modification of Barraquer's instrument which he had been using; this enabled more delicate manipulation to be carried out, and had no valve which could get out of order. His chief difficulty had arisen from the separation of the cup from the lens when traction had been applied, so that in some cases the instrument had to be reapplied a number of times. Sometimes rupture of the capsule had ensued, sometimes recourse had to be had to the cystotome or scoop. He was sure some of the difficulties had been due to defective suction; in the earlier cases it was not appreciated how poor the suction was. In the latest Barraquer instrument a manometer was incorporated—a great gain.

Of the 38 cases, 22 could be said to have had a quite successful result, the lens being removed entire in its capsule, and there were no difficulties or complications at the time. In 5 others the lens was removed in its capsule, but there was some loss of vitreous. Thus there were 11 cases in which he failed to remove the lens with the instrument, and other means of doing so had to be resorted to. In 7 cases the lens was expressed after either rupture of the capsule by the instrument, or after cystotomy; and in 4 cases the scoop had to be resorted to. In 9 cases in the series there was loss of vitreous. In one, suppuration occurred and evisceration was performed. In every other case some useful vision at least resulted.

He proceeded to discuss the advantages and disadvantages of the method. Among the advantages was that the whole capsule was removed with the lens, tags of it could not become incarcerated in the incision, and, further, no secondary needling operation was necessary. An important advantage, also, was absence of post-operative iritis. And it was gratifying to see a uniform black pupil after the operation.

The outstanding disadvantage of the method was the frequency of vitreous loss, and its consequences. When such loss occurred, he did not doubt that the prognosis, both immediate

and remote was worse than when there was no such loss. In 23.7% of his cases there was loss of vitreous. And a very important result was, that the welling of the vitreous into the wound carried the pillars of the iris into the incision, and a deliberate attempt to replace them resulted in further loss. And should any secondary operation be needed in the first day or two, the risk of vitreous again became important. The danger, however, was much minimized by paralyzing the orbicularis with novocain. In Barraquer's method the lens was drawn out of the eye, not expressed from it; therefore a slight negative pressure was developed within the globe, so that the vitreous tended to suck back rather than to follow the lens, and this might render loss of vitreous more frequent than would otherwise be the case. And in many cases there was need for a complete iridectomy. Altogether, he considered that the operation had in it a considerable element of danger, especially in the matter of vitreous loss, so that for general use it was inferior to the older method. But for immature cataracts and sclerosed lenses, the Barraquer method has distinct advantages of its own.

Discussion. MR. M. HEPBURN thought the necessity of using and gripping an instrument must hamper the delicacy of manipulation, required for such an operation.

COL. H. SMITH, urged the deferring of any secondary operation for 10 days. In the intracapsular operation the iris was more likely to prolapse. The orbicularis should be under thoro control while the operator was at work.

Intracapsular Extraction of Cataract.

MR. D. V. GIRI began his paper with a description of a simple technic. It was based on 384 cataract operations he did at Bikaner, Rajputana, India. He had to resort to the intracapsular operation because his patients came long distances, were very poor, and time was of great value to them. One patient became so restless after the incision, and rolled his eye so much, that the operation could not be done step by step; hence the

operation had to be done speedily, and he therefore expressed the lens in its capsule. Very little pressure was needed, and it came away without mishap. After that, he proceeded to deliberately take out the cataract *in toto*. He described his procedure. The lids were best held apart and controlled by an assistant thruout the operation. For immature and intumescent cataracts, the intracapsular was the operation *par excellence*. If capsulectomy was properly done, the mature hard cataracts shelled out easily as a whole. In a large precentage of mature and hard cataracts, the capsulectomy operation gave results which compared favorably with the intracapsular. The worst cataracts to deal with were the hypermature and complicated. The paper entered into every step of the procedure with particular minuteness, and contained a comparison with other procedures.

Disorders of the Blood and their Ophthalmologic Manifestations.

SIR HUMPHRY ROLLESTON, in opening the discussion, said that whereas patients with renal disease, arteriosclerosis, or affections of the central nervous system might first seek medical advice on account of ocular symptoms, and a diagnosis of underlying general disease might be made from the local changes, such was rarely the case in disorders of the blood. The disorders which he discussed were as follows: erythremia, pernicious anemia, subacute combined degeneration of the spinal cord, aplastic anemia, chlorosis, secondary anemia (posthemorrhagic), splenic anemia of adults and of infants, leucemia (with chloroma), scurvy, purpura, hemophilia. The underlying cause of erythremia was still a matter for further research, possibly it might prove to be a syndrome due to various causes. The frequency of ocular manifestations in it was as yet indeterminate. The visual disorders were variable, and could not be solely explained by the appearance of the fundus. In pernicious anemia small retinal hemorrhages were usually present; according to Cabot they occurred in over 70%, and they were said to be seen

when the red cells fell to 25% of the normal. In subacute combined degeneration of the cord, the ocular manifestations were mainly those of anemia—dimness of vision and pallor of the disc; also slight papilledema. There might be sluggishness, small size and irregularity of the pupils, and nystagmus owing to degeneration in the cervical cord. Retinal hemorrhages and neuroretinitis might occur in aplastic anemia. In some of the cases of this now rare disease, there was permanent impairment of vision. In severe secondary anemia, hemorrhages into the retina were very common, and this was probably chiefly due to the underlying toxemia. In the chronic splenic anemia of adults, he did not know of any special changes in the fundus. In the splenic anemia of infants (Von Jaksch's anemia pseudoleucemia infantum) retinal hemorrhages probably occurred, but he could not state with what frequency. In Gaucher's disease the conjunctivae showed a wedge-shaped thickening of brownish-yellow color, with its base to the cornea, first appearing on the nasal side of each eye.

Moore described three stages in the retinal changes accompanying leucemia; (1) engorgement of the vessels, chiefly the veins. (2) The previous engorgement was accompanied by hemorrhages having a central white spot, due to leucocytic accumulation. (3) A general leucocytic infiltration of the retina and choroid, causing thickening. Contraction of visual fields and night blindness might also result in this disease. The visual symptoms were not of diagnostic importance in scurvy. Infantile scurvy might show petechiae of the eyelids. In purpura, flame shaped hemorrhages into the nerve fiber layer of the retina were not uncommon, according to Foster Moore. In hemophilia the retinae may be free from hemorrhages.

SIR FREDERICK ANDREWES, F. R. S., spoke on the pathology of disorders of the blood in relation to the eye. Functional disturbances of vision did not need much attention. When thru heart failure or thrombosis, the blood supply to the retina was cut off or

seriously reduced, vision might fail. In ordinary syncope temporary failure of sight might occur without structural change. Yet vision did not appear to fail in even the extreme degrees of pernicious anemia; only in the post-hemorrhagic form of anemia did temporary blindness sometimes occur. Yet vision was commonly affected in the converse condition, erythremia, in which the red cells and the total volume of blood were increased.

Visible changes in the fundus took place as vascular alterations in blood conditions, and nowhere could the changes be so well studied. He believed that in chlorosis there was an increase in the fluid elements of the blood, and this was the only form of anemia in which papilledema had been observed to occur. He discussed edema, extravasation of leucocytes, escape of red corpuscles, and leucemia, remarking that it was possible the retinal hemorrhages in the last named depended in part on a weakening of the capillary wall from the emigration of leucocytes. He also entered into a minute consideration of the function of the blood platelets.

DR. A. J. BALLANTYNE said that more than 50% of the cases of anemia and leucemia he saw in nine years showed fundus changes of some kind, including alterations of the caliber, course and color of the vessels, edema of the retina, retinal hemorrhages, and retinal exudates. In simple anemias there was a tendency to broadening of both arteries and veins, also to an abnormal tortuosity. Pallor of the discs was often visible, but notable pallor of the fundi was exceptional. Hemorrhages were never found in the retina when the hemoglobin was higher than 35%. Often the hemorrhages and exudates cleared up when the patient was at rest in bed.

MR. R. R. JAMES then said he had not seen fundus changes in chlorosis. He detailed the blood picture found in the various classes of cases he had examined during a period of 14 years' hospital observation.

The Bowman Lecture. This was by George E. de Schweinitz, President of the American Medical Association

on "Certain Ocular Aspects of Pituitary Body Disorders, Mainly Exclusive of Usual Central and Peripheral Hemipic Field Defects."

Diagnostic Significance of Proptosis.

MR. WILFRED TROTTER introduced this subject. He said diagnosis was still essentially a clinical procedure carried out in the face of experience presented to the medical man unselected and at random. He intended to present in this paper only material which came directly within his own knowledge, restricting his consideration to the grosser forms of proptosis.

A broad division of cases could be made according to whether the eye was displaced anteroposteriorly alone, or whether the anteroposterior projection was combined with some other displacement. The first of these depended on swelling of the orbital tissues from inflammatory conditions or circulatory disturbance; the others, to encroachment upon the orbital space by a swelling—generally a neoplasm—originating within or without it. The general surgeon mostly saw the first group in connection with traumatic orbital hemorrhage, thrombosis of the cavernous sinus, arteriovenous aneurysm within the skull, and Graves' disease. These he considered in detail.

In the second group the cause at work was a swelling originating within or encroaching upon the orbit. The great point to determine was whether or not the cause was a malignant tumor. It usually was so when the eye was displaced forwards and also in the coronal plane. Such benign conditions, however, as mucocele of the accessory sinuses, exostosis of skull and benign nasal growths, could cause it. Malignant growths invading the orbit could be divided according to their place of origin, into those of ethmoid, sphenoid, and maxillary regions. Growths of the ethmoid and maxillary regions produced marked and early displacement in the coronal plane; growths of the sphenoid region tended to produce a downward and lateral displacement, at a later stage. All these forms of malignant disease were of insidious onset, and often

when their true nature was recognized they were beyond the hopeful reach of surgery. Growths of the ethmoid region were usually recognized by the rhinologist, in whose domain they came. Sometimes their course could be definitely delayed by operations which, at the time, appeared to be very unpromising. Growths in the sphenoidal region presented the greatest difficulties in early diagnosis; they were usually endotheliomata or sarcomata of the periosteal type. Sometimes they might be slowly developing for several years before causing unmistakable symptoms. He related a very interesting and instructive case.

Discussion.—MR. J. H. FISHER devoted his contribution to a general review of the subject. The term "proptosis" directed attention to something retroocular which was propelling the eye forward, or, more correctly, a falling forward of the eye because it was imperfectly restrained in its orbit by muscles. The prominent eyes of very obese persons occasionally brought them within the title, and he had had to perform tarsorrhaphy for this condition; this possibility should be kept in mind in diagnosis. Foster Moore had found fat in the orbit in Graves' disease to be in an abnormal condition; but Treacher Collins considered that Müller's muscle caused the condition, regarding it as the analogue of the "protrusio bulbi" muscle of lower animals. The proptosis in Graves' disease was not always symmetric, or of synchronous onset in both eyes. In both this disease and orbital tumors, X-rays were often of but little value. As removal of optic nerve tumor, whether with or without resection of the outer orbital wall, rarely left a passable cosmetic result, he strongly advised removal of the blind eye with the growth in every instance. Traumatic exophthalmus would depend on the presence of a foreign body lodged in the orbit, or the pressure of extravasated blood, or infiltration of the tissues with air thru the fractured walls of the orbit from the nose or some of its accessory sinuses. Hemorrhage into the orbit might oc-

cur without accident, such as in children suffering from whooping cough or scurvy, in hemophilics, and in later years of life attributable to arteriosclerosis. Cysts following hemorrhage had been described. Congenital dermoid was the most frequent cyst of the orbit; others included hydatid and cysticercus, but these could only be proved by examination after operation. Cellulitis and infective osteitis of the orbit were easy to diagnose. In all cases of proptosis with inflammatory manifestations, examinations should be made for paralysis of any of the nerves running in the floor or outer wall of the cavernous sinus. Vascular tumors of the orbit with proptosis must be differentiated into pulsatile and non-pulsatile, the latter being mostly cavernous angiomas. He advocated association with the neurologist in dealing with intracranial causes of proptosis; these he dealt with seriatim. Similarly, in cases of extension of growths from the accessory sinuses of the nose, the assistance of the rhinologist might be needed in dealing with the septic conditions in those cavities. The rhinologist invoked the aid of the radiologist, but both together often gave the ophthalmologist less assistance than he needed.

DR. ANGUS MACGILLIVRAY followed Mr. Fisher. He said the apex of the cornea was between 12 and 14 mm. in front of the temporal margin of the bony orbits; when readings of over 14 mm. were taken, exophthalmos was present, when under 12 mm. enophthalmos. The routine use of the exophthalmometer was desirable. Proptosis due to increase in the orbital contents was the result of certain inflammatory, pathologic, or traumatic conditions originating in the orbital cavity, such as periostitis, cellulitis, neoplasms, vascular derangements, and thickening of orbital walls. These were the main conditions causing proptosis which the ophthalmic surgeon was likely to be called upon to treat. He divided proptosis, for diagnostic purposes, into (a) bilateral, and (b) unilateral, the first being much the smaller division. He discussed them at length, and said, in conclusion, that

after 28 years of experience in the ophthalmic department of a large general hospital, he and his colleagues had come to regard proptosis as a danger signal, and the help of colleagues in other departments was sought without delay in arriving at a cause.

MR. P. G. DOYNE also read a contribution on the subject.

Mr. Roper, Mr. Johnson Taylor, Mr. T. Harrison Butler, Mr. Mayou, Mr. Traquair, Mr. Inglis Pollock, Mr. Beatson Hird, Mr. Healey, Mr. Bernard Cridland, Mr. Green (Norwich) and Mr. Foster Moore also took part, and the openers replied.

MR. W. T. HOLMES SPICER read a paper on **Secondary Corneal Opacities.**

Macular Changes with Thrombosis of Central Retinal Vein.

MR. F. A. WILLIAMSON-NOBLE described the appearances in four cases. These are indicated in the following details of the first case. The sight of the patient, who was aged 27, had been failing 18 months before excision of the eye. There was old interstitial keratitis, the cornea being opaque and ectatic. He showed microphotographs of the sections cut at different angles. It showed the usual picture in venous thrombosis, and the thrombosis had occurred in the region of the lamina. Sections of the half-eye showed vascularization of the middle and deeper layers of the cornea, and hemorrhage in the nerve fiber layer of the retina. There was slight edema in the external molecular layer of the macular and perimacular region. He concluded (1) that in cases of thrombosis of the central retinal vein, a varying degree of edema developed in the region surrounding the fovea, causing damage to retinal structures here. (2) That if edema were of old standing or large in amount, some of the fluid percolated thru the subretinal space, caused detachment of retina in the macular region, bringing about its degeneration.

Clinical Meeting.

On Friday afternoon a clinical meeting was held at the London Hospital, Whitechapel, when a series of interest-

ing cases were inspected and discussed.

Mikulicz' Disease.

MR. F. A. ROSS and DR. SHEPHEARD-WALWYN reported a case which was illustrated by photographs. The patient was a married woman, aged 37. The bulging below the eyebrow was found to be due to a finely nodular enlarged lacrimal gland. There were the usual symptoms and physical characteristics of the disease. The urine was normal, and the Wassermann negative. Immediately preceding death she had air hunger, cyanosis, and edema of both lungs, the physical cause of death being acute nephritis and uremia. The tubules of the lacrimal gland, according to Dr. Canti's report, were normal, but were pressed apart by masses of round cells containing a few fibroblasts and fibrous tissue cells. The various treatments tried, and the clinical course were carefully set forth.

Other Papers.

The following papers were also read:

MR. B. T. LANG: The Unobstructed Field in Perimetry.

MR. JOHN ROWAN: A Case of Intraocular Tumor, presenting some unusual features.

MR. G. F. ALEXANDER: Measurement of the Diameters of the Cornea and Pupil and the Interpupillary Distance.

Enucleation of the Eyeball Under Local Anesthesia.

MR. ANGUS MACGILLIVRAY pointed out that the services of the expert anesthetist were not always available, and in his absence the administration might be indifferent. In the search for a suitable local anesthetic, a 2% novocain solution was fixed upon, owing to its comparatively low toxic properties, and in practice his confidence in it had increased. The solution consisted as follows:

Novocain 10 grs.; Sodii chlorid 2 grs.; Potass. sulph. 1 1/2 gr. Aq. distil. 1 oz. It should be kept in a stoppered bottle, and could be sterilized more than once without deterioration if adrenalin were not added. He de-

scribed the procedure in detail. It was not necessary to prepare the patient as for general anesthesia. To neurotic or frightened patients, two 5 gr. doses of veronal were given the previous day, i. e., at 5 and 10 p. m. The method could be easily adapted to all forms of extraocular operations. He believed that when once the details of the method of securing local anesthesia had been properly grasped, it would become the routine, general anesthetics being reserved for young children.

Microscopy of the Living Eye.

MR. BASIL GRAVES (who is Lang Clinical Research Scholar at Moorfields, and Pathological Curator at the Royal Westminster Ophthalmic Hospital) read a thoughtful paper on this subject. He described, with the aid of diagrams projected with the epidiascope, the main principles of illumination of the eye, and discussed the selection of a suitable nomenclature for certain conceptions which, arising out of this new work, at present lack suitable definitive terms. He felt that a vague, equivocal or unjustified use of certain terms is creeping into the English literature on this subject. Such terms as diffraction, fluorescence, scattering, internal refraction have a very precise significance in the nomenclature of the physics of light. He suggested that for the present the unsubstantiated appropriation of such terms for various clinical effects is apt to lead to confusion among writers, and is wanting in scientific accuracy.

He pointed out that a speculative use of such terms was furthermore unnecessary because for the moment we are concerned more with the making use of results than with the explaining of their cause. He suggested certain noncommittal terms to indicate various effects, which he explained by diagrams, among them the word "relucency" for that property of a transparent living tissue in virtue of which a beam of light traversing it undergoes modification, to be revealed as a manifest illumination of the tissue. He pointed out how in the ordinary method of oblique illumination with a pocket lens and a widespread light

source, the view of deeper structures was not clear, because of illumination occurring in those transparent tissues which are in the line of observation. As instancing, however, what was possible by means of the ordinary method in the hands of a skilled observer, he quoted the detection of the finer cases of Mr. A. C. Hudson's "brown line" in the cornea.

After referring to the principle of diaphragm lamps, such as those of Gullstrand, Lemoine and Valois, he demonstrated a hand torch (not on the diaphragm principle) to give an intense beam 4 mm. in diameter, for use in clinical inspection of the eye with the pocket loupe, or in such operations as needling, with the aid of which the operator could clearly see the membrane to be needled by observation thru tissue whose transparency is not impaired by aberrant rays of light. He illustrated the four main headings under which could be grouped the methods of illumination for microscopy of the eye, and as a substitute for vague and multiple terms at present in use for three of these, he suggested the adoption of terms which he is accustomed to use in his own notes: "Direct illumination," "Retroillumination," "Proximal illumination." The fourth method, elaborated by Professor Vogt, he designated "Specular reflection." He then gave, by diagram, examples of the manner in which different physical conditions could operate in these main methods.

He went on to discuss the Zeiss binocular microscope, an instrument which has been made in its present highly efficient form for many years. He suggested that this instrument had not previously been adopted more generally by ophthalmologists chiefly for two reasons: (1) its scope would have been better indicated if it had been named the binocular eye microscope instead of the corneal microscope. And it had always been provided with an attached automatically registering illuminator which lacks sufficient intensity in its light source, and whose optical design is unsound for the purpose required of it, because it yields a beam of light very wide in diameter.

He had no wish to detract from the great value of a special focal illuminator such as the slit lamp; but as a preliminary or adjunct to the use of this, some illuminator attached to the microscope, giving a wider yet still restricted beam, and in automatic registration with the focusing of the microscope was, he contended, very desirable in routine work on microscopy of the eye.

He described how possessors of the Zeiss eye microscope can, themselves, at a very small cost, alter the optical system of the illuminator, so that it will yield an intense focal illumination of about 4 to 5 millimeters in diameter. With this it is possible to get a very clear view under high power of the blood corpuscles moving in the corneal channels of an old case of interstitial keratitis. In more advanced work, e. g., in Vogt's method of using the slit lamp by observing the endothelial corneal surface by reflection, in which only a very small area is illuminated and the visual background is dark, Mr. Graves prefers on occasions to facilitate the location of certain features by illuminating the background with light introduced from such an additional second source. He pointed out that the Lucanus quadrant was better than the alternative Gullstrand semicircular rail as a mount for this illuminator, because it so happens that the pivoting of the illuminator to the quadrant by a movable joint enables the focused light to be swung at will to and fro across the field of observation. This, with the alterations described, gives excellent facility for quick, simple inspection of the eye under circumscribed focal illumination, without a veiling of the view of structures on a deeper plane resulting from illumination of those more superficial tissues thru which observation must be made.

Other Papers.

The following papers were also read:

MR. HUMPHREY NEAME: Results of Further Investigations on the Passage of Arsenic into the Aqueous Humor after Intravenous Injection of Novarsenobenzol in Rabbits.

Mr. W. B. INGLIS POLLOCK: A Case of Pseudoglioma.

Mr. G. F. ALEXANDER: A Theorem Generalizing the Optical Problems of Ophthalmoscopy and Skiascopy.

During the sittings of the Congress a Museum of instruments, appliances and books was open in the Marcus Beck Museum of the Royal Society of Medicine. On Thursday evening members dined together. All the sittings were well attended, and at the close the President was cordially thanked.

H. DICKINSON.

JOINT MEETING OF THE CHICAGO OPHTHALMOLOGICAL AND CHICAGO MEDICAL SOCIETIES.

March 7, 1923.

Dr. ROBERT VON DER HEYDT, President of Ophthalmological Society, in the Chair.

Cooperative Work Between Medical and Surgical Practitioners and Ophthalmologists.

Dr. GEORGE E. DE SCHWEINITZ of Philadelphia, quoted von Graefe's expression when he first used the ophthalmoscope. "Von Helmholtz has unfolded a new world to us," and showed how with improved methods of technique, as well as with new instruments, the values of observation were greatly enhanced, and the importance of medical ophthalmoscopy elevated.

Tracing, very briefly, the advances which had been made in general medicine and general surgery during this period, he described how the so-called "specialties" (especially ophthalmology) had moved from a position of comparative isolation to one of closer affiliation with the methods of exact general diagnosis and therapy, and why it had become necessary for general medicine, surgery, neurology, etc., to summon to their aid the advantages of ophthalmology and ophthalmoscopy.

After detailing some historic data as to the recognition of refractive anomalies of the eye, he spoke especially of Donders' work, and of the important observations of Weir Mitchell in association with William Thomson and

Ezra Dyer, fifty years ago; which did so much to focus the attention of the profession on the enormous amount of evil of which such refractive errors were capable, and of how their correction had revolutionized the treatment of headache, many functional nervous diseases, gastric disturbances, etc.

He expressed the belief that this co-operation between internal medicine, neurology and ophthalmology, which resulted in Mitchell's proclamation fifty years ago, was the first potent stimulus in the movement of correlating special and general work.

Everywhere progress followed increasing specialism and cooperation; this was noticeable in all departments of varied activities, and must necessarily be so in medicine and surgery, the practice of which, in the widest acceptance of the term, was far too complex to be the task of any one man. He insisted, that as a foundation for so-called special medical and surgical work, general training was necessary, postgraduate work was essential, and a practical knowledge of fundamentals—anatomy, physiology, pathology—of paramount importance. The foundation of successful therapeutic effort in complicated cases consisted in painstaking clinical examination, history records, exact research and cooperation.

Dr. de Schweinitz pointed out how frequently a local lesion, in the eye or elsewhere, was not an independent disease, but a local lesion; that is, one interpretation of a constitutional difficulty, or a general toxemia. Speaking of focal infections, he discussed briefly how the resistance of the part affected might be reduced by some other agency, and the localization of the germs thus determined. Such an agency might be chemical, physical, or depend upon a chronic infection, and examples illustrative of the influence of such agencies in these circumstances were given. He also discussed briefly the care which must be exercised in hunting for a focus of infection, but deprecated any tendency to sacrifice teeth, for instance, before expert examination had proven that extraction

was necessary, and that in no other way could sterilization be obtained. He spoke of the dangers of exploration of the paranasal sinuses, and the responsibilities which rested upon those concerned in work of this character.

He concluded with the record of a number of case histories which illustrated the value of cooperative work between the family physician, internist, surgeon, oto-laryngologist, ophthalmologist and dental surgeon, and laid great stress on accurate history taking as an adjunct in all this work. A brief reference was made to those patients who had many times been examined, that is, those who had had frequent laboratory tests, etc.; an endeavor should be made to utilize previous work as far as possible. He discussed the advantages of indicating "leads" in such cooperation, coming, as the case might be, from the general or the special standpoint; if such "lead" failed to bring the searcher to the cause, naturally others could be followed until the investigation was completed.

The essayist spoke of the advantages of consultation between the medical man and the ophthalmologist before certain remedies were employed in a given case, altho indicated by the cause of the malady. It was an easy matter, he urged, to find out from the practitioner whether in his experience such and such a remedy had been tried, and if so, what its results had been. Some rather startlingly unfavorable results after the administration of tuberculin were mentioned. The advantages of early recognition of vascular lesions in eyes was referred to, as well as the advantages in these circumstances of early treatment from the general standpoint.

Discussion.—DR. JOSEPH M. PATTON, speaking from the medical standpoint, felt that all physicians should take Dr. de Schweinitz's very able paper as a sort of criticism of their methods of handling some patients. He doubted if the average general practitioner would ever be able to make his ocular examinations for himself, and was convinced that much might be gained by the cooperation so strongly advocated.

In the hospital, as a routine measure, there was cooperation with the oculist in all cases involving the diagnosis of intracranial conditions, blood dyscrasias, toxemias, and frequently of the cardiorenal disorders associated with hypertension. In private practice, this was often neglected, and in office practice, especially, the profession was open to criticism for failing to take advantage of the aid which the ophthalmologist could give.

He had for many years made it a practice to send his patients to a competent ophthalmologist whenever anything suggestive of involvement of the eye came up, so that he would know what the condition of the eye was and whether he was missing any of the symptomatology. There were sometimes symptoms in the eye premonitory to general symptoms in the patient's economy, and by this cooperation one could check up the course the therapeutic steps should take.

Endocrinology was in the transitional stage and probably overworked, but in many cases where the ductless glands were apparently at fault, much information could be obtained from careful examination of the eyes. He believed that an ophthalmologist should not give a definite opinion on any case without going thoroly into the history of the patient. The value of cooperation to the general practitioner lay in getting an opinion from a man who had knowledge of the eye and could correlate it with his general knowledge of the economy, but this aid has been neglected because the cooperative spirit had not been in force. The vascular relations should be studied in every case, and there was no place where changes were shown as early and as prominently as in the eyegrounds. He considered the paper not only timely but full of wise advice to the general practitioner.

DR. EDWARD JACKSON, of Denver, said that essentially the subject presented by the speaker of the evening was a question of cooperation between those who had different experiences and different viewpoints; and cooperation was only possible under certain conditions. Two of these conditions

appeared as essential. It had been emphasized that many ophthalmologists, general practitioners and surgeons who were good men did not appreciate that nimbus of professional knowledge that existed outside of their own experience, and it was possible to utilize this only thru coordination of one's own experience with truths recognized by another man's intelligence. Coordination of individual experiences becomes possible thru two things: First, a basis of common preparatory study, the basis of the general medical course that all good specialists had gone thru, which gave a common means of transmitting to each other the views that were often the most suggestive and valuable.

The other point that must not be lost sight of was the very practical point, that two men who had different training could cooperate fully only if they had the habit of cooperation. The personality of the consultant and the acquaintance of the two men played a great role in the matter. Consultation was the exchange of ideas of two independent thinkers and investigators, and it did not reach its highest possibilities until they had consulted many times and knew each other, as well as each knew his specialty.

An ophthalmologist would care for the opinion of a particular internist, or a particular surgeon. The general practitioner would have his favorite consultants; and to him the opinion of those particular tried friends, with whose intellectual processes he was familiar, was worth more than the opinion of the equally serious student with whom he was not familiar.

The matter of working together might be fostered by group practice. It had been fostered not only by the meeting of friends in consultation, but by the meeting of friends and exchanging of views when there was no patient present, and no consultation on any particular case. Many possibilities of cooperation among the different individuals of the profession were just now being apprehended and experimented with, and were still to be developed.

DR. GEORGE F. SUKER emphasized the need of bearing in mind the plain facts stated in the paper. He thought all were more or less guilty of neglect in taking advantage of available facts, and too hasty in making examinations, and drawing conclusions. He believed one of the most important things was careful history taking, particularly among ophthalmologists, who were so likely to see the eye and nothing else. The eye should be looked upon only as a part of the general economy, and an effort made to find out what was the matter with the latter, and whether the individual part fitted in with the whole.

He always made it a point to speak on the relation of the eye to general diseases in such a way, that the general practitioner might find some things of interest. The ophthalmologist must pay particular heed and attention to what the family physician, be he at the crossroad or in the city, had to say about the patient he referred. It was his knowledge, as the family physician, that oftentimes gave the clew necessary for the successful treatment, and the great thing was to be more fraternal in the correlation of the findings and views.

It was well for the general practitioner to attend the meetings of the ophthalmologists and much more necessary for the ophthalmologists to attend the general meetings. Dr. Suker was of the opinion that one could not at present treat any condition of the eyes, except perhaps the simple refractive errors, without taking into consideration the entire makeup of each individual patient, and no organ should be left out. Diagnosis made by exclusion was far better than diagnosis made by inclusion, and consultation would prevent jumping to conclusions, as the profession was so prone to do. A simple consultation, not necessarily with the patient present, oftentimes led to better thinking and analysis of the case. There was often opportunity to "talk shop" at luncheon, and this did much to harmonize the interests between the various specialists and to review many points that were lost sight of in an office practice.

DR. A. J. OCHSNER believed the ideas Dr. de Schweinitz has brought forward would be applied very much more commonly in the future, because the specialist in the future was going to be a doctor. If there was any one the general practitioner and the surgeon should fight shy of, it was the specialist who was not a doctor; but who became a specialist immediately upon leaving medical school, because specialism was easier and promised to be more profitable than the tedious general practice. The hospitals now made it possible for the recent graduate to spend several years in becoming thoroly familiar with medicine in general before specializing. Thruout the address of Dr. de Schweinitz, it could be felt that he spoke not only as a specialist, but as a doctor.

DR. WILLIAM H. WILDER said that the address brought home the importance of cooperation in this age of specialties, and all could appreciate the truth of Dr. de Schweinitz's statement that there was a danger in specialism if the specialist had not the background of general training. The specialist had no contention against the general practitioner, or the general practitioner against the specialist, but unquestionably the specialist was frequently to blame for not seeking cooperation. It took the ophthalmologist a quarter of a century to convince the practitioner that such a thing as strain of the ciliary muscle of the eye might excite general headache, but finally he was convinced and sent many of his cases of headache to the specialist.

One now frequently saw the specialist engaged in the study of cases of headache to the discredit of the ophthalmologist, who frequently failed to differentiate the varieties of headache. He might see a case of migrain, typical or atypical, which he thought he could cure by a slight change of glasses. One frequently saw cases with slight change, in which the specialist failed to see that the case was out of his province.

On the other hand, he thought it essential to keep constantly before the general practitioner the necessity of

seeking the aid of the ophthalmologist. It was well known that in certain conditions of intracranial pressure, the optic nervehead would show a condition that was choked disc. Where the result was a mechanical one, it was more an edema and not so much a neuritis. The practitioner, knowing this to be true, after getting a negative report from the ophthalmologist, would often be content to base his opinion on this, when he should know that the swelling of the optic disc might appear at any stage of the growth that was causing the intracranial pressure, and might not appear until a short time before the lethal termination of the case.

The general practitioner should never feel that one report was final. Repeated examinations were necessary, for when this important sign did appear it was of great value. Exchange of ideas between the practitioner and the thoughtful ophthalmologist was extremely valuable, and the speaker thought they should be very grateful to Dr. de Schweinitz for introducing the subject.

DR. DE SCHWEINITZ, in closing, said his object in bringing up what seemed to be a desultory array of facts, with which all were familiar, was to make a plea for the cooperative work, which had been described between the great major specialists, for the minor specialists which fitted into each other's work, so that the whole thing might be complete.

CLARENCE LOEB,
Corresponding Secretary.

COLLEGE OF PHYSICIANS OF PHILADELPHIA.

Section on Ophthalmology.

January 18, 1923.

DR. MCCLUNEY RADCLIFFE, Chairman.

Bilateral Optic Nerve Disease Following Sinus Infection.

DR. LUTHER C. PETER presented a man, aged 35 years, who suffered from bilateral uveitis in 1915, with a second attack in 1918. Laboratory studies failed to reveal anything but a positive von Pirquet, altho the clinical examination seemed negative. An X-ray study

showed old foci of disease in the apices of the lungs. Tuberculin treatment was begun, and the patient improved only to have subsequent relapses. Recovery was never complete. An excessive dose of tuberculin was administered by mistake by an assistant, and was followed promptly by a most violent focal reaction. This, however, subsided under subsequent small doses of tuberculin.

Studies of the sinuses failed to reveal any evidence of disease. In the summer of 1921, the patient observed an area up and to the temporal side in which he could not perceive light. This area gradually spread past the macula and involved the entire eye. In about three months, the eye became blind. In February, 1922, a similar process invaded the right eye, from above downward, and in a few months, light perception was lost. Further studies of the sinuses showed both sphenoids and posterior ethmoids badly diseased. They were opened up and curetted. No recovery in vision was noticeable until about two months ago, when the patient saw light in the lower left hand field of the right eye. The entire temporal retina is now responsive to light to within ten degrees of the macula. In the lower left hand field of the left eye, there is light perception and light projection. The apparent hemianopic condition of the restored fields is probably not significant of invasion as far back as the chiasm. The process, in all probability, has been limited to the optic nerves as they pass thru the optic foramina, an extension process. X-ray examinations of the orbits, including the optic foramina, however, revealed no visible changes in the bone.

The relation of the sinus condition to the tubercular toxins in the production of the eye symptoms is most interesting. The fact that recovery was not complete under tuberculin was in all probability due to the diseased condition of the ethmoids and sphenoids. In former articles, attention has been called to the necessity of careful study of the posterior accessory sinuses in tuberculous conditions within the eye. In cases which resist treatment by tuberculin and other proper measures,

it would seem most advisable that the sphenoids and ethmoids be most carefully explored, and, if necessary, opened up and drained.

Complete Paralysis of Third and Partial Paralysis of Fourth Cranial Nerve.

DR. LUTHER C. PETER presented a patient, aged 32 years, who in February last suddenly developed double vision and drooping of the right upper lid, accompanied by a severe pain in the head. She was admitted to the Philadelphia General Hospital and treated with salvarsan and mercurial inunctions. A few days ago she came to the Polyclinic Hospital. At this time she showed a complete ptosis of the right upper lid, and complete paralysis of all the muscles supplied by the oculomotor nerve. The eye is in position of extreme external rotation. When asked to look down and out, there is an abortive attempt at torsion. It is probable that the fourth nerve, while paretic, is not completely paralyzed. A Wassermann test has not been made, but in all probability the palsy is luetic in origin. A surface lesion, as the nerves make their exit from the brain substance, may be responsible for the palsies. The suddenness of the onset and the fact that there were no other complications, strengthens the belief that the lesion is either in the nuclear region or in the fasciculi before the nerve trunks make their exit from the brain tissue.

Extensive Burn of Face and Eyelids.

DR. WM. CAMPBELL POSEY exhibited a man with an extensive burn of the face, in consequence of which the right lower lid was entirely lost and the left greatly ectropionized. He proposed to correct the deformity by means of a Thiersch graft in the right eye and Esser inlay in the left.

He referred to a case seen by him some years ago of entropion of all four lids, where the cornea had been exposed for twenty years, and notwithstanding this, the cornea had but slightly hazed and vision was practically normal in each eye. He said he preferred pedicle flaps in the restoration of the function of the lids after

burns whenever the surrounding skin was healthy. He recalled a case of a young woman whose face was severely burned by vitriol, in consequence of which not only were all the lids ectropionized, but the skin of the nose burned away and the mouth much distorted. An attempt at the correction of the ectropionized lids and the covering of the nasal bone by pedicle flaps all at one sitting proved futile, on account of the difficulty in respiration which arose when the false openings in the nose created by the burns were closed by the flaps. A later operation upon the nose by Dr. John B. Roberts successfully closed these openings.

Discussion.—DR. LUTHER C. PETER said about six months ago he had a similar case in which the ectropion, the result of an acid burn, was limited to the upper lids. There was complete eversion of the right upper lid and partial eversion of the left upper lid. The eyelash border was adherent to the skin in the brow; and the conjunctiva of the under surface of the lid and the fornix was hypertrophied and redundant. The patient was unable to see because of the deformity and the hypertrophy of the conjunctiva. A small incision was made at the margin of the lid in the brow, the lid dissected loose and turned down into place, and sutures introduced into the lid margin and fastened on the cheek by adhesive plaster. Thiersch's grafts were then applied and covered with rubber dam, and the eyes bandaged for five days. The patient made a good recovery with lids fairly normal in appearance.

Quantitative Perimetry.

DR. LUTHER C. PETER called attention to the inadequacy of taking fields with the white test object alone, altho this method is probably quite as illuminating as field studies with colors, without regard for standards in the matter of light, preexposure, surrounding field, and fixation. Without proper standards, the Bjerrum method of taking fields on tangent planes naturally grew into favor, and with modifications has continued in popularity. Those who have contributed most to the quantitative technic in recent

years are Sinclair, Traquair, and Walker. That the technic is simple, is not complicated, and is less fatiguing to the patient and operator is conceded. Its general application, however, to all forms of field studies, and its ability to uncover every variety of field change, and the tendency of substituting a quantitative technic for the more accurate qualitative methods are debatable questions.

Clinical evidence gained, especially in glaucoma, from Bjerrum's sign, Rönne's step, Seidel's sign, etc., has confirmed the correctness of our knowledge of the distribution of the retinal nerve fibers. Clinical and pathologic studies of the corticovisual centers have also clearly outlined representation in the cortex in a most orderly manner. Macular centers are represented at the posterior poles of the hemispheres, and the peripheral retina is serially projected forward along the calcarine fissure. The inferior retina has cortical representation in the inferior lip of the calcarine fissure, while the superior retina is represented in the superior lip. Isolated lesions, therefore, in the retina itself, or in the cortical centers, and even in the optic radiation, may cause only a small peripheral or central defect without involving other fibers. The compactness of the visual fibers of the optic radiations, chiasm, and optic nerves, on the other hand, explains the wide extent of the damage, when these structures are injured by disease.

The first source of error in quantitative perimetry, therefore, may be in the detection of minute peripheral lesions, because a small test object may narrow the limits of the fields so as to fail to detect a small peripheral cutting, which either the red or blue stimuli would readily pick up. A second source of error will be found in studies of the central field in glaucoma, where the minutest white test object may fail to give evidence of a Bjerrum sign, altho a small green test object will readily reveal such a beginning scotoma. Third: in retinal and choroidal disease the behavior of colors cannot be ignored. This is especially true in functional night blindness and in other forms of retinal and choroidal disease.

The distinct field of quantitative pe-

rhymetry as a part of a good general technique lies first in its use in outlining the dividing line in chiasmal hemianopsias, or even homonymous hemianopsias, when peripheral limits are somewhat contracted. It can be used advantageously after careful qualitative studies have been made to check up any possible increase or contraction of the field. Finally, it serves as a good method for neurologists in making preliminary studies in brain cases. Such studies, however, should be supplemented by good qualitative methods.

Traquair modifies his quantitative method by including colors. The gradual reduction of the colored stimuli is the most valuable method of picking up minute changes. The fact that clinicians have found color sensitivity a most elusive study, and physicists have devoted much time to the determining of color thresholds, color sensitivity, and color limits, confirms our convictions that in pathology we cannot ignore the patient's response to colored stimuli. Quantitative perimetry should, therefore, take its place as a method in perimetry, and should be accorded its real value, but it cannot safely replace qualitative methods without the loss of much useful information in a large percentage of cases.

Tuberculous Iritis.

DR. T. B. HOLLOWAY reported the following cases:

CASE 1: Colored, male, aged nineteen. No tuberculous family history. Specific disease was denied. The patient came to the Wills Hospital about January 3rd, stating that the eyes had been inflamed since March. The globes were moderately injected, each cornea showed rather wedge shaped infiltrates at the limbus below, with scattered pinhead sized infiltrations occupying the various layers of the corneae. In each eye there were numerous synechiae, but no tubercles were noted in the iris. X-ray of the teeth and sinuses were negative; that of the chest had not as yet been received. Nose and throat, urologic and blood serum examinations were negative. There were vague pulmonary signs, but nothing definite of tuberculosis. While in the hospital for several days, the temperature was frequently subnormal.

CASE 2: Female, aged nineteen. First

seen at the Wills Hospital in June, 1922. Medical examination revealed a mitral stenosis but no definite signs of pulmonary tuberculosis. Wassermann and urine negative. Teeth and sinuses negative. Keratosis pilaris about eyebrows. X-ray of the chest showed adenopathy of both roots, lung picture not diagnostic of tuberculosis. Tension while under observation normal and subnormal. The right eye was moderately injected, there were a few vague infiltrates in the cornea, and moderate iritis, but no true tubercle formation. A drawing, made by means of the corneal microscope, shows widespread iridic involvement, with ten to twelve typical tubercles. There was a greater involvement in the lower portion of the cornea than in the fellow eye.

Discussion.—DR. WM. CAMPBELL POSEY said he had seen a number of cases of solitary tubercle of the iris, mostly in colored subjects, and had been interested in observing the manner in which Descemet's membrane had resisted the intrusion of the tubercular process, notwithstanding the fact that the tubercles were impaled against the posterior surface of the cornea for weeks. Finally, in most of these cases, the substantia propria of the cornea became invaded from the periphery, the bacilli gaining entrance to that membrane thru the spaces of Fontana. He had noted in the literature that some pathologists now deny that Descemet's membrane has such protective qualities. In many of his cases the tuberculous process in the eye seemed to be primary, altho he understands that it is the general opinion that there must be foci elsewhere in the body. He has found injections of old tuberculin of very great value in combating tuberculous processes in the eye.

Microcornea and Congenital Cataracts.

DR. G. ORAM RING exhibited a girl, aged thirteen years, with the right eye convergent and amblyopic. Microcornea and lens cataractous. The left eye, microcornea, a dense small white plaque at posterior lens pole surrounded by an area of less dense opacity, with a vision of 20/200.

The mother was married at 25. First child, miscarriage. Second child died

at 7 months. Third, patient exhibited. Fourth died at 5 months and had congenital cataracts, microcornea, and colobomata of irides. Fifth, girl, living, aged 8 years. No ocular defects, but undersized. Sixth, miscarriage. Seventh, girl, aged 5 years, with no eye trouble and fairly healthy.

CHARLES R. HEED, M.D.,
Clerk.

BALTIMORE CITY MEDICAL SOCIETY.

Ophthalmological Section.

March 22, 1923

DR. JESSE DOWNEY, Chairman.

Experiments Bearing on Physiologic Optics.

DR. A. H. PFUND of Johns Hopkins University. The following is a brief account of certain experiments performed by the writer in connection with his work on optics. These experiments are being presented in the hope that they may contain a few points of interest to this body of ophthalmologists. The subject matter falls under three headings:

1. White light and white surfaces.
2. Reflection coefficients of white pigments in the ultraviolet.
3. Safety goggles.

A source is said to emit "white" light when the visual stimulus occasioned by that source is without color. When the temperature of a solid is gradually raised, the light emitted is successively reddish, yellowish, white and, finally, bluish. Recent experiments carried out at the U. S. National Bureau of Standards have shown that a body emitting white light has a "black-body" temperature of 5,800° Centigrade—a temperature which is nearly the same as that of the sun. It is therefore recommended that the light of the noonday sun, to the exclusion of skylight, be adopted as a standard of "white light."

If such white light be allowed to fall upon a sheet of paper which reflects all colors to the same degree, the paper is likewise said to be white. When several sheets of white paper from different sources are laid side by side, it is found that some sheets are yellowish, others bluish, so that it is

impossible to decide which one is truly white. None of the usual color measuring devices can be called upon to decide the matter—because of lack of sensitiveness. To solve this problem, the writer developed a colorimeter in which multiple reflections are allowed to take place between similar surfaces. If the surface has any outstanding tint, it is greatly accentuated and is thus made amenable to measurement. The instrument is being used with great success on papers, white paints, pharmaceuticals, etc.

While the preceding discussion applies only to the reflection of visible rays, it seemed of interest to extend the investigation into the ultraviolet region of the spectrum. In many respects this is the most interesting spectral region, since it gives rise to such effects as fluorescence, bactericidal action, irritation of the eyeball, cataract, etc. Without discussing the results obtained in detail, it may be mentioned that the two most interesting substances found were the oxid of magnesium and of zinc. Of all substances studied MgO approaches a true "white" most closely. In fact the reflection coefficient of MgO is uniformly 98% from the visible spectrum into the ultraviolet as far out as wave length 2,500 A. U. If, therefore, a wall is to be coated with a layer possessing a high reflection coefficient in the ultraviolet, MgO is quite decidedly the best. On the other hand, if it be desired to realize a white surface which reflects very little ultraviolet light, ZnO is to be chosen since the reflection coefficient of this pigment drops abruptly to values less than 5% just beyond the visible violet at wave length 3,700 A. U.

The third point to be considered deals with goggles designed to protect the eye from injurious radiations emitted from furnaces, arcs, etc. Regardless of whether or not the ultraviolet alone is responsible for eye irritation and cataract, or whether the intense heat radiations also play a role, the writer has taken the standpoint that both the ultraviolet and the heat radiations ought to be removed so that only visible radiations of moderate intensity reach the eye. The goggle glass consists of two components, one of which is a yellowish glass which removes the

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ultraviolet by absorption. The other component is a disc of clear glass coated with a semitransparent film of gold. This gold film is still amply transparent to visible light, but has the remarkable property of reflecting the heat waves almost completely. Then, instead of absorbing the heat rays and raising the glass in front of the eye to an uncomfortably high temperature, the heat rays are reflected back and hence the glass remains cool. Tests on these goggles at the Bureau of Standards show that 99% of the harmful rays are removed; and that practically only visible, greenish light of moderate intensity reaches the eye.

Here and There in Ophthalmology.

DR. HIRAM WOODS said one frequently received more information from informal discussion in the Pullman and Smoking Room than from set papers.

There has been a great change in ophthalmology in recent years; formerly one considered the eye lesions as more or less local and treated them as such, while with our broader view of pathology we realize they are only signs of general pathology which are investigated and treated accordingly.

An internist's attitude towards the oculist has also changed, as now they expect him to give some indication of general pathology. Pupil relations should be more carefully studied; particular care being taken to prevent associated movements. An unusually quick response of the pupil may be a premonitory Argyll Robertson symptom. Prompt response to dim light, with little reaction to strong light is not explainable. Ophthalmoscopy, by the early picking up of lesions is of the most value.

Scotoma are also of great importance and should be investigated before the eye becomes tired.

One word of caution should be uttered in regard to the magnifying of unimportant conditions and thus making confirmed neurasthenics of the patients.

Ophthalmia neonatorum is apparently less frequent than formerly, and fewer cases are admitted to the blind school.

Discussion.—DR. HARRY FRIEDENWALD. The relation of the internist and the oculist are becoming more satisfactory,

but they are still not ideal. To be ideal the oculist should have a complete grasp of internal medicine, and the internist should be familiar with ocular changes.

I do not believe the internist will ever become an expert diagnostician with the ophthalmoscope, or else the subject is exceedingly difficult for myself.

DR. C. A. CLAPP. I wish to emphasize a point brought out by both Dr. Woods and Dr. Friedenwald, which is the making of a confirmed neurasthenic over a trifling matter, and the inability of the internist to make these small points of distinction.

A case in point, "A young man consulted a prominent internist on account of headaches, who looked at the nerve-heads and informed him that he probably had a brain tumor." To be sure one border of the nerve head was somewhat less distinct than the other, but fields, blind spots and other tests were negative. The patient, however, is a confirmed invalid as a result of "The probably brain tumor."

DR. WOODS. Those who have had the largest experience and know the most are the least positive in their statements.

C. A. CLAPP,
Secretary.

COLORADO OPHTHALMOLOGICAL SOCIETY.

February 17, 1923.

DR. C. E. WALKER presiding.

Choroidal Rupture.

F. R. SPENCER and C. L. LARUE, Boulder, presented a man, aged thirty years, who had come on account of eye-strain. His history included a blow on the left eye by a blunt object from a sky rocket several years previously. The eyeball had not been cut open. The patient had an inactive and practically healed pulmonary tuberculosis. The vision of the eye which had received the blow was 6/60. Ophthalmoscopic examination of the right eye was negative, but the left vitreous contained floating opacities, and a large scar from an old choroidal rupture ran vertically near the macula.

Retinal Detachment: Question of Cataract Operation in Second Eye.

C. A. RINGLE, Greeley, presented a man, aged fifty two years, whose left

eye had been operated upon for cataract at the age of forty-five years. After this operation, corrected vision had been nearly normal until four years later, when there was sudden loss of vision from detachment of the retina. There was now an almost mature cataract in the right eye, the vision of this eye being reduced to counting fingers at three feet. The patient was otherwise in excellent health, altho the urine showed a trace of albumin and a good deal of mucus and pus, and there was a history of tuberculosis of the bladder twelve years previously. The cataractous eye was highly myopic, and the patient's previous refractive condition had been myopic. A cataract operation on the patient's brother had failed. Should an operation be attempted on the patient's cataractous eye?

Discussion.—F. R. SPENCER, Boulder, remarked that in Vienna, eleven years previously, he had been told by Prof. Fuchs that most of the operations done on myopic eyes in the latter's clinic had been followed by retinal detachment.

G. L. STRADER, Cheyenne, Wyoming, I saw this man several years ago. He informed me that there had been considerable disturbance at the time of the cataract operation. I imagine from what he said that he may have had hemorrhage into the vitreous.

MELVILLE BLACK, Denver, remarked that the lens was not entirely opaque, and thought it would be well to leave the eye alone until the vision was practically entirely lost.

Uveitis.

W. C. and W. M. BANE, Denver, presented a man, aged thirty-one years, who had come complaining of a feeling as tho there were a foreign body in the right eye. The vision of this eye was 5/10, of the left eye 5/5. The case was treated for a few days as one of conjunctivitis. The patient then complained of photophobia. The pupil was dilated with difficulty, showing a few slight adhesions, which broke up after a while. Numerous deposits of varying size were then discovered on the lower part of Descemet's membrane; and later on similar

deposits were noticed on the lower half of the lens capsule. A laryngitis had begun about the same time as the eye disturbance. There was no history of lues or tuberculosis, but since February 13 the patient had been kept on mercury suppositories of 7.5 grains daily.

Discussion.—MELVILLE Black, Denver. This is undoubtedly a case of uveitis. The teeth should be looked into, as well as the question of focal infection elsewhere, and tuberculosis and syphilis. I have seen benefit obtained in some similar cases from the use of Lugol's solution.

Tuberculous Keratitis.

JAMES M. SHIELDS, Denver, presented a man, aged thirty-two years, who seven years previously had been under treatment by another oculist for a corneal disturbance in the left eye, diagnosed as tuberculous keratitis. At that time injections of old tuberculin had been given, and recovery had been complete. At present there was a rather deep linear opacity near the upper limbus, without any sign of vascularity. While in the army in 1917, the patient had had what he referred to as a "flare up" in one eye, he did not recall which. This attack had cleared up completely after removal of an abscessed tooth. Another attack while overseas in 1919 had subsided after removal of another abscessed tooth. In October, 1922, the right eye had again become painful, and the oculist who had taken care of the first attack had put the patient on injections of old tuberculin. There had been some improvement but not complete recovery. The right eye now showed no pericorneal injection. In addition to the linear opacity which probably represented the original attack, there was a deep oval corneal opacity at about eleven o'clock, about three mm. inside the limbus, and approached by a leash of bloodvessels from the limbus. Skiagraphs of the mouth showed an impacted third molar and a large abscess at the root of the bicuspid, and both of these teeth would be removed before beginning the further use of old tuberculin injections.

Discussion.—EDWARD JACKSON, Denver. The present appearance of the left eye does not strike me as strongly indicative of tuberculosis. It may well be a case of focal infection.

C. A. RINGLE, Greeley, remarked that a tonsillectomy had been performed, but that there was a mass of buried tonsil on the left side, so placed as to afford poor drainage.

W. H. CRISP, Denver, remarked that the corneal opacity was similar to, altho more advanced than an early corneal disturbance in which he had had a successful result from the use of tuberculin.

W. C. FINNOFF, Denver, did not think that the present condition of the eye suggested tuberculosis. The newer lesion had a slight blush somewhat resembling sclerosing keratitis. But the iris was negative and there was no synechia.

Peripheral Corneal Opacity with Lens Disturbance.

W. T. BRINTON, Denver, (by invitation) presented a Japanese, aged thirty-six years, who two years previously had noticed a white spot on the margin of the cornea. He had had slight itching of the lids, but there was no history of active inflammation. In the course of twelve to eighteen months a white band had gradually developed near the corneal margin. This at present occupied the corneal circumference with the exception of about six mm. above and slightly outward. The band was one mm. broad and somewhat irregular. There was a clear strip of cornea between it and the limbus. In the lens were fine linear opacities, arranged radially. The vision had gradually failed, and was 5/10. The tonsils had been removed two years previously, and Wassermann test and examination of the teeth and sinuses were negative.

Discussion.—MELVILLE BLACK, Denver. The fact that both lens and cornea are affected suggests a nutritional disturbance probably originating in the ciliary body. That is, there is probably a chronic uveitis. The lens is rather likely to go on to total opacity.

G. L. STRADER, Cheyenne, Wyoming.

This man was under my care for episcleritis. There was then probably a little involvement of the cornea but not much. All this opacity has developed since about a year ago, as I remember. When I saw the man his vision was normal.

F. R. SPENCER, Boulder, thought the opacity was rather suggestive of a former scleritis.

W. H. CRISP, Denver, also suggested that the disturbance might come under end result of several attacks of scleritis occurring at various points around the cornea.

DR. BRINTON, (closing) suggested that the corneal opacity might be the the head of one of the corneal dystrophies.

W. H. CRISP,
Secretary.

OMAHA AND COUNCIL BLUFFS OPHTHALMOLOGICAL AND OTO-LARYNGOLOGICAL SOCIETY.

December 10, 1922.

DR. DEAN, President.

Recurring Blebs on Cornea.

DR. F. S. OWEN presented a young man who had recently recovered from interstitial keratitis which, after running the usual course, cleared up quite completely. Some time later, a little bleb appeared on the lower part of the right cornea. The epithelium over it was removed several times, but it recurred every time. Several days later, the whole outer covering of the bleb was removed and the surface cauterized with carbolic acid. The surface remained smooth for several days, but now a smaller bleb can be seen to be present.

Discussion.—DR. HAROLD GIFFORD stated that he has seen similar vesicular formations of the cornea, but never as a result of interstitial keratitis. These cases are some times relieved by stripping off all the epithelium including an area beyond the margin of the bleb. In one case the blebs were bilateral and were cured by using the actual cautery in one eye, and by applying trichloroacetic acid several times

in the other. These remained healed for over a year. He recently saw a case reported in which the treatment of Schoeller was used with success. It consists of removing the epithelium and painting the surface with fresh acquori. Dr. Dean reported a similar case before the society some time ago, in which he applied 10% cocain to loosen the epithelium and then pulled the whole epithelium off.

Iritis, Corneal Lesions.

DR. HOLST presented a farmer, nineteen years old, with an unusual form of iritis. He was first seen six months ago when he had a severe iritis, two weeks after having a foreign body in his eye. The immediate attack seemed to yield to salicylates and atropin, but after two weeks a yellowish nodule two millimeters in diameter developed above the pupil. This suggested a diagnosis of tuberculosis, but the complement fixation tests for tuberculosis were negative. He was, however, given a course of guaiacol. Now, five months after his last visit, he shows two small calcareous areas at the site of the former nodule, and a very similar area which was seen by slit lamp illumination to rest on the surface of the iris. He wished to ask the society's opinion whether or not this was the site of a former tubercle.

Discussion.—DR. HAROLD GIFFORD asked if there was any possibility that the nodule could have represented an encapsulated foreign body. DR. HOLTZ said that there was no break in the cornea at the time of the injury, which would have suggested such a possibility. DR. BANISTER advised a Wassermann. DR. HOLST thinks that the fact that the lesion has cleared up so well without any specific treatment is against lues and rather in favor of tuberculosis.

MEMPHIS SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY.

March, 1923.

Parenchymatous Keratitis.

DR. J. A. HUGHES presented the case: A. T., white, female age 8 years, came to my office on Oct. 22, 1922, to see about her eye. On examination I

found a fairly well developed child, but thin and pale and gives history as follows:

Family history: Father and mother both living and in good health, never had syphilis. This is the only child born to them.

Past history: Has had all diseases of childhood. Started to school when she was six years old and kept up her school work as other children.

Present history: Right eye burning and photophobia began Oct. 20th and gradually grew worse. When seen in my office on Oct. 22nd could not stand light, and on examination of right eye I found three or four small dim gray maculae making their appearance near the center of the cornea, and every day since I have noticed new maculae come and their density increase and spread out toward the margin of the cornea, especially on the temporal side. You can now see any number of blood vessels as they come up over the cornea. Vision in this eye was 20/40 the first time I saw her, and now she cannot count fingers with that eye.

About four weeks after onset of right eye, the left eye became involved very similar to the right, except the first maculae began near the margin of temporal side of cornea and is now gradually spreading to center. And in both eyes you can find most all the stages of parenchymatous keratitis, and in the mouth almost typical (Hutchinson's) teeth.

Etiology: As a rule parenchymatous keratitis is a disease of children from 6 to 12 years of age, and usually more prevalent in females. It is usually caused by hereditary syphilis.

Treatment, local: Dark glasses, Moist hot compresses, atropin and iodine. **Internally:** Mixed treatment three times a day and mercury inunctions once a day. I consulted Dr. Haase in regard to 606, and he advised continuing mercury inunction for a few weeks. In his opinion it is better than salvarsan as it is not eliminated so quickly.

Discussion by E. C. Ellett and J. B. Blue.

D. H. ANTHONY,
Secretary.

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JEAN MATTESON, Room 1209, 7 West Madison Street, Chicago, Ill.

REQUIREMENTS FOR RESEARCH WORK.

That the future of ophthalmology, as of any other branch of medicine, lies in progressive research work associated with clinical experience, no one doubts. But how to develop in the young generation the taste and the ability for such a task is a difficult endeavor, which has been worked out in different ways according to different environments, races and countries.

There are comparatively few men who want to devote themselves to research work, because it is a more difficult, slow and tiresome task than to follow the beaten tracks and rely on the experience of others. The investigator has as his principal reward self gratification. The taste for research work is an inborn quality, very similar to the compelling power which drove the great explorers to advance in unknown lands, struggling against fatigue and death, unmoved by any other considerations except their own ends and ideals. This quality exists undeveloped in many men to whom no chances have been offered, but asserts itself as soon as the opportunity arises.

The great development of ophthalmology in Germany before the war was in larger part due to the systematizing of teaching, bringing out and pushing ahead talents of the young for investigation. How well the machine was geared, is shown by the steady outpour of new scientific material in the past years, even during the hard times that postwar conditions have brought in German universities.

In the United States, research work is being done at an increasing pace, and in the near future, it may range at the same level with the most advanced countries. However, this movement has not acquired in ophthalmology the same impetus as in other branches of medicine, such as bacteriology, nutrition, biologic chemistry, pathology, and others. Encouragements are not wanting, as shown by the Knapp Testimonial Fund of the American Medical Association and other foundations; but the results are not yet remarkable. Young physicians devote themselves specially to operative work, to refraction, or to the description of rare and interesting cases. Some undertake pathology and bacteriology; but very few go into the deeper problems of

physiology, physiopathology, neurology, etc., of the eye.

This state of affairs may be considered from the standpoint of the student, the subject, or the facilities for investigation. The example of the professor and the environment of a hospital and laboratory, play a great part in stimulating research work in ambitious men. Where the professors or heads of departments confine themselves to routine work, operations and refraction, and do not undertake the intensive study of cases and problems necessary for productive research, the atmosphere will become stagnant and little progress can be expected. The professor is the soul of the department and must not rely upon the initiative of others; but realize rather the reverse, that everybody is counting on him, and expecting advice, encouragement, and leadership. Where the last is forthcoming and associated with a high scientific standing in ophthalmology, the students will have every encouragement and take a direct personal interest in the cases and problems at their command.

Unfortunately, in our institutions the professor has not, as a rule, the supreme authority and the facilities and resources which can give him a free hand to start research work and develop the possibilities of the students. His powers are generally limited and his initiative does not weigh much with the board of directors or trustees. However, he can accomplish much if he struggles to obtain the proper recognition, and succeeds in asserting his own authority.

Every ophthalmic clinic needs a small laboratory of its own. It is not sufficient that the facilities of the general laboratory of the hospital are available. The requirements, however, need not be large. The writer has seen in Europe, small one-room laboratories, in which very fine advanced work was done. On the other hand, large laboratories without compelling and progressive heads, will confine themselves to routine or unimportant work.

Numerous and well trained assistants are as essential in every clinic as

a good professor. They must all receive compensation as large as possible under the existing conditions, and be able to rise in a schedule of promotion, from the lowest place gradually, to chiefs of clinic. Amongst them will be found afterwards the instructors and professors.

One of the greatest drawbacks for promoting research in our clinics is the lack of a corps of permanent, well trained assistants. As, generally, they do not receive any salary, the professor can not ask a continuous, steady service. Either they come irregularly, or give the smallest time possible to the clinic, and can not be trusted for difficult examinations. From their standpoint, however, they are perhaps justified in this attitude; as not having any salary, no perspective of promotion and finding little scientific encouragement, they soon realize that their own interest lies elsewhere, in places where they can see many cases, or many operations, or have some small surgical cases for themselves.

The assistants must be the same in every clinic, and have fixed time for work, at least two hours daily. The first assistant shall give the consultation, reserving important cases for the professor.

From this gradually trained corps of assistants, the best talents generally raise themselves to higher levels. Research is more easily undertaken if they spend more time in the clinic every day, and have all the facilities at their command.

Subjects for investigation are not always easy to find by the students. However, suitable points may be obtained from the study and interpretation of obscure and rare cases, by reconsidering general problems, and by taking special problems again in hand and examining them from different angles. It is the duty of the professor to help the students in this selection, ascertaining which subject is suitable for each, according to his preferences and training.

It is important to emphasize that the subject selected for research must be a productive one. Medical literature is

crowded with articles dealing with small, petty points, which are a hindrance rather than a help. High quality and not quantity should be the goal of a constructive investigation.

To attain originality, a thoro acquaintance with the work done before is essential. The literature of the subject must be reviewed not only in current medical publications, but in the original sources as well. For that reason a selected Ophthalmological Library is of the greatest importance together with the Laboratory, to the student.

In the proper environment for research, another very important requirement is the facility for a full exchange of ideas with men engaged in other fields of medical investigation. When another field different from his own is touched by the student, he will do well to consult and get suggestions from persons who have experience and see his doubts and problems under different lights from a higher and a wider point of view. The time has passed when an isolated worker is able to cover a large range of subjects.

The proper financial assistance is often lacking to young investigators, but this should be overcome by a trust fund in the hands of the professor, to be allotted to those deserving such aid. Often original investigators will not ask for such assistance in order that they may avoid being tied to show some results. This subsidy should be forthcoming from the clinic or some special organization.

Around every professor a retinue of scientific workers will generally gather, and it is highly advisable that research should be encouraged and if possible "taught" to the selected students by the objective lessons of practical endeavor, thru the work of the professor or some of the assistants.

M. URIBE TRONCOSO.

THE VISION OF STUDENTS.

The suggestion made under correspondence (p. 617) is a definite, concrete contribution to ocular hygiene, carrying into actual operation what

has long been known to oculists and occasionally forced on the attention of educators, with regard to the handicap that defects of ocular refraction place on their possessors in school and college work. This handicap may be a little more serious for the student of engineering, who must do a good deal of accurate mechanical drawing; but it is serious enough for the average pupil in the grade or high school, or the college student. When it comes to the extended reading now required for the study of "English," or history, or the dictionary work required in the pursuit of foreign languages, or the great mass of reading to be done in the professional schools of law and medicine, or the accurate instrumental discriminations to be made in many fields of science, the handicap is felt by many who do not actually break down or fail to pass.

School and college announcements very often contain suggestions with regard to the health and convenience of prospective pupils. Is there any suggestion more important than this regarding the health of the eyes, on the active and continuous use of which, the pursuit of most courses of study directly depends? All educational schemes make much of the examinations to determine whether the student is prepared, by mental ability and mastery of preliminary studies, to go forward in his course. Yet none seem to consider it worth while to inquire whether he is really physically fit for the work which the curriculum must entail. How many medical schools make sure that their students have the visual power that they will certainly need for reading and laboratory work; altho careful to preserve their class A. standing by requirements of college credits.

Whether it is forty per cent or twenty-five per cent that actually fail on account of the visual handicap, or break their health with recurring headaches, or lay the foundation for later loss of vision, or lowered nerve tone and efficiency, the prevention of these instances of wasted effort, disappointment, discouragement and low-

ered usefulness is worthy the attention of all who have, or can make, the opportunity to prevent them. E. J.

CONSERVATION OF VISION

The question of educating the public with reference to the care of their eyes is brought up from another point of view by the communication on page 618. The Eyesight Conservation Council was proposed, we understand, by certain benevolent gentlemen, largely interested in the optical business. Its purpose was to bring before the public by literature and speakers, the importance of the correction of defects of refraction by the wearing of properly chosen glasses.

The desire of these gentlemen to win the confidence and attention of the public led them to seek the assistance of certain oculists. The need for education of the public in this matter is known to all of us. The oculists to whose attention the plan was brought considered it with sympathetic interest; and it was so presented that some of them permitted the use of their names on the list of the Board of Councillors. For various reasons such names do not now appear on that list, the only physicians whose names do appear there, being the head of the Teachers' College of Columbia University, the State Health Officer of North Carolina and a member of the U. S. Public Health Service. The other members of this Board are physicists, engineers, social workers, educators, ministers, and a "publicity director." These names, presumably, help to give standing to the "Council" and secure attention for its propaganda; but none of these gentlemen seem to have any special knowledge of the eye, its diseases, dangers, physiology or hygiene.

The object of this corporation is stated in its by-laws to be: "To promote the general conservation and betterment of vision." This it seeks by the circulation of literature, and the organization of a bureau of speakers to address meetings of local organizations such as Rotarian and Kiwanis clubs, chambers of commerce, schools and colleges.

The publications are chiefly small folders, suggestive posters, and a vision chart for schools; that are supplied at cost. We have examined them and found in all the moral of the story, the climax of the appeal points to the wearing of glasses. "When Joe returned to school last week he had on a becoming pair of glasses." "Tom probably needed glasses before the accident that made so much trouble." "Many of these cases merely require lenses to correct the defect which causes the eyes to cross." In a manufacturing establishment "the following condition was discovered: Glasses worn and satisfactory 8 per cent; glasses needed and ordered 83 per cent." "Every manager should see to it that the eyes of all associated with him are corrected to compensate for defects."

But in all this propaganda for "eyesight conservation" there is no pointing out that vision is sometimes defective from congenital conditions other than errors of refraction, is impaired by disease not due to eyestrain, or should be guarded from injury in any other way than by wearing goggles. There is no hint that this highly differentiated organ of the body should receive the care of one who had medical training, to say nothing of the special studies of the anatomy, physiology and pathology of the eye.

The "General Director" of the Eyesight Conservation Council in an article on "Eyesight as a National Problem" (*Journal of the National Education Association*, v. 11, p. 362) says "The most desirable solution is an arrangement by which each pupil receives a thoro eye examination by a competent refractionist."

Nowhere in all this literature do we find any distinction between oculist and optician or optometrist; all are alluded to under the terms "refractionist," "specialist," "skilled men," etc. The whole tendency is to continue and extend that confusion in the public mind regarding educated and uneducated advisors, which always favors the short cut "doctor," or the tradesman seeking professional recognition.

We do not wish to imply that the Eyesight Conservation Council does no good, or that a man of average honesty cannot believe he is justified in supporting it. We do wish our readers who may be asked to pass judgment on its literature or to take part in its propaganda, as speakers before local organizations, to understand clearly what it is and what it is doing. If they believe a better guide to conservation of vision can be given the public than the sign "optometrist" on a street window, they should act accordingly. It should be clear that the general service which the medical profession owes to the public at large, in this matter, will not be given for us by those who are seeking to sell glasses. E. J.

BOOK NOTICES.

Senile Cataract, Method of Operating.

By W. A. Fisher, M.D., F.A.C.S., Chicago, Cloth, 270 pages, 161 illustrations, 112 of which are colored. Chicago, Eye, Ear, Nose and Throat College.

This is a presentation of the various methods of cataract extraction, as they are done and taught at the present time. Three-fourths of the volume is from other writers, most widely known in this connection, each presenting the method with which he is most familiar; and having chosen it for himself would teach it to others. The names of the different collaborators, and the subjects and length of the various chapters they have contributed, are as follows:

Professor Ernest Fuchs, Vienna, Austria. The capsulotomy operation, 12 pages.

Professor Ignacio Barraquer, Barcelona, Spain. The intracapsular operation. (Faccoerisis) 94 pages.

Lt. Col. Henry Smith, London, (formerly Amritsar, India) Chapter III, the capsulotomy operation, 19 pages; and Chapter IV, the intracapsular (Smith-Indian) operation, 47 pages.

H. G. Holland, Shikarpur, India, the intracapsular operation, 22 pages.

John Westley Wright, Columbus, Ohio, the intracapsular operation, 21 pages.

W. A. Fisher, Chicago, Chapter VII, the intracapsular operation of Arnold Knapp and the capsulotomy operation of Homer E. Smith, 4 pages; Chapter VIII, the intracapsular operation, 34 pages; and Chapter IX, a method of acquiring operative technic (on kittens' eyes) 23 pages.

Prepared and published in this way, this small volume presents the facts, views and judgments of eminent operators, in condensed form and touching on such points as will undoubtedly command the greatest interest on the part of the mass of readers who do cataract operations. All these writers have previously set forth their views in journal articles, but it is convenient to have them gathered in one small volume, and no better exponents of the views expressed are to be found anywhere.

It is significant of the mutual relation between surgical knowledge, literature and travel, that the editor of this book has had close personal contact with each of his collaborators, who habitually use three different languages and live in widely separated parts of the world and in totally different social surroundings. It is the printed page that makes this connection of experience and interfusion of ideas possible.

The illustrations in this book show instruments and steps in operative technic. The colored illustrations have a general background of color, against which certain details are brought out in white and others by the black lines. They give clearness to the descriptions; and so make this book a better guide to the choice of the operation which the reader will learn for use on his cataract patients. E. J.

War Blindness at St. Dunstan's. By

Sir Arnold Lawson, K.B.E., Late Surgeon, Royal London Ophthalmic Hospital. 150 pages. Oxford Medical Publications, London, Henry Frowde and Hodder and Stoughton.

St. Dunstan's, the great institution for the war blind, in London, was built up by Sir Arthur Pearson, who after a successful career as a publisher

retired from business at the age of fifty-four, on account of approaching blindness. This was in 1910. When provision for the war blind had to be made in 1914, he devoted himself and his fortune to building up a great institution for their care and reeducation. At St. Dunstan's the cases were under the professional care of Major Arthur Ormond and Sir Arnold Lawson. It was to redeem the promise of the latter to Sir Arthur Pearson (who died in December, 1921) that this book was written.

The total number of war blind in Great Britain was estimated at 1,833, of which 25 per cent became blind thru disease. Under Lawson's care came 825 men with total incapacity from loss of sight; and 225 others, who for various reasons could not be admitted to the institution. Attention is called to "a group of men who still retained a little useful and very precious sight, barely sufficient for earning any sort of living, and maintained so precariously that it would be endangered by the learning of handicrafts such as those taught to the blinded men."

The work is divided into three parts. Part I deals with traumatic blindness. It is based on 407 cases. Of these 72 were cases of wounds by bullets passing thru the orbits, 12 of the cases being here cited in abstract. Then come fractures of the skull causing blindness, of which 17 cases of occipital fractures are given in abstract; and 12 cases of fractures of other parts of the skull. Concussion blindness, without direct wound or penetration of the globe, 16 cases, comes next. Finally miscellaneous cases of special interest are given, 5 from premature explosion of bombs, 2 from explosive bullets, 2 from airplane accidents, 4 by burns with chemicals. These injuries total 289.

Part II. The number of cases of nontraumatic blindness was 417. In connection with them, it is pointed out that it is not advisable to accept for active military service any man with defective sight in both eyes from old uveitis, and that great importance attaches to defective sight in one eye,

however perfect the other may be. "A careful ophthalmoscopic examination of every candidate should always be made by somebody who has real knowledge of the subject. If this had always been done, a large number of cases of active congenital diseases, such as retinitis pigmentosa or other forms of fundus disease, such as chronic choroidoretinitis of various kinds, would have been refused, and the State would have been saved disability pensions amounting at the present time to very many thousands of pounds per annum." "The war should teach us these three lessons with regard to eyesight examination, and if they are taken to heart they will at least help to force upon hospitals and medical colleges the absolute necessity of securing a better ophthalmoscopic education for medical students."

The enormous importance of syphilis is pointed out, it causing certainly 75 per cent, and probably more, of cases of optic atrophy. Interstitial keratitis and other varieties of inflammatory disease furnished 138 cases. There were 109 cases of primary optic nerve degeneration and 44 of secondary atrophy of the nerve. Detachment of the retina was the condition in 29 cases. There were 17 cases of family atrophy of the optic nerve, 28 of retinitis pigmentosa, 16 of malignant myopia, 11 of glaucoma, and 7 primarily due to cataract. Traumatic neurasthenia is illustrated by 4 cases, 2 are ascribed to bilateral embolism of the central retinal artery. Recurrent retinal hemorrhage, Graves disease, retinitis proliferans, and meningitis are each represented by one case. Of pituitary tumor there are 3 cases.

Part III, dealing with pensions and reeducation of the blind, is of especial interest as coming from this source. The war history of pensions for disability of the blinded soldier is outlined. The struggle was to obtain pensions for men blinded by disease, contracted or aggravated by unfavorable conditions encountered in the service. The author says: "My personal view was, that it was in the in-

terest of the State to part with the little extra sum needed to pension off these unfortunate men, whether they were strictly entitled to the boon or not. After all, they had lost their sight whilst serving their country, and it was not good that there should be blinded men distributed over the country, able to say this, and to point the moral of a great nation's ingratitude."

The chapter of twenty pages on the reeducation of the blinded soldier is brief enough to be read by every ophthalmologist. It will give him a general insight into the conditions and difficulties, of problems on which he may at any time be asked for advice; and where a broad understanding of the situation may be greatly needed to balance narrow impressions and the over influence of sentimentalities. This comment would apply to the whole book. What it contains will not be found in other books, and ought to be known to all engaged in ophthalmic practice. Not since the appearance of Fuchs' monograph on the causes of blindness has there been published a book of such practical value on this aspect of ophthalmology.

E. J.

Diseases of the Eye. Sir John Herbert Parsons, F.R.C.S., F.R.S., Surgeon, Royal London Ophthalmic Hospital, etc. Fourth Edition, 668 pages, with 21 plates and 326 illustrations in the text. New York, The Macmillan Co.

It is sixteen years since this treatise was first published, and it has developed thru its successive editions. There are not quite so many pages as in the early editions, but by a better filled page and the use of smaller type, it now contains more text, more illustrations and more plates, than did the early editions.

It is divided into eight sections. Section I, seventy-three pages, on physiology, contains also elementary and physiologic optics and a chapter on the neurology of the eye. Section II, sixty-six pages, is devoted to the examination of the eye. Section III, on diseases of the eye, occupies three hundred and twenty-five pages divided

in twenty-two chapters. In this section are included symptomatic disturbances of vision, intraocular tumors, injuries and operations upon the eyeball. Section IV deals, in twenty-nine pages, with refraction and accommodation, one chapter, eight pages, being given to retinoscopy. Section V, fifty pages, considers disorders of motility of the eye. Section VI, twenty-one pages, tells of ocular manifestations of diseases, of the nervous system and other diseases. Section VII, fifty-six pages, treats of diseases of the lids, lacrimal apparatus and orbit.

Section VIII is ten pages on "Preventive Ophthalmology." This is a new section, taking up the causes and prevention of blindness, and the hygiene of vision. The author hopes it will emphasize the need of special attention to these matters by students, teachers and examining bodies; and will indicate the widespread ramifications of applied ophthalmology. There are also three appendices, on preliminary investigation of the patient, therapeutic notes and requirements for public services.

Most of the plates represent ophthalmoscopic appearances of fundus lesions, but six give those of the anterior segment of the eye. Many of the illustrations are to show the pathologic histology of the eye, including bacteria and lesions of the conjunctiva and cornea, uveal disease, including tubercle of the choroid, and secondary cataract.

Parsons' book is soundly scientific and practical. It is one of the best for the student who is entering ophthalmology to make it his life work. It will start him right and indicate what will help him to go still farther. At the close of the chapter on physiology, Parsons writes: "I would seriously impress upon the student that success in the diagnosis, and hence in the treatment, of diseases of the eye is impossible if such elementary principles of optics as are set forth here are not thoroughly mastered." The presentation of elementary optics is clear and made without use of algebraic formulas.

The chapters on neurology of vision and the ocular manifestations of diseases of the nervous system (not in the early editions), are particularly strong.

E. J.

Ophthalmic Section, Department of Public Health, Egypt. Ninth Annual report, 1921. A. F. MacCallan, Director of Ophthalmic Hospitals. Quarto, 32 pages, Cairo, Government Press, 1922.

The twenty ophthalmic hospitals of Egypt are under one direction. In them, in 1921, were seen 113,000 new patients, 65,000 operations were done and over 1,000,000 visits recorded. These hospitals grew out of the service of the travelling hospitals, of which there are still five. As these demonstrated the need for such service, permanent ophthalmic hospitals were built, until now there are 15 of them, situated in 14 provinces, and two more are being built. The surgical staff of these hospitals is entirely Egyptian, altho the Director is British.

Of 127,223 applying for treatment, 15,619, or 12.2 per cent, were blind in one or both eyes. According to the latest census, 1917, those thus blind constitute 4.358 per cent of the whole population of Egypt. The percentage of patients coming on this account rises regularly with age, from 4.68 per cent under one year to 40.34 per cent of those over 70. Among these cases of blindness are 1,705 of absolute glaucoma, 775 being binocular; and 1,499 of cataract. Cases of congenital blindness numbered only 17.

The number of glaucoma cases was 2,254, or 1.77 per cent of all applying for treatment, and of these 75 per cent were already blind in one eye. In six years the glaucoma cases have numbered 13,433. The operations done on these include 1,380 iridectomies, and 3,065 trephining with iridectomy.

As might be expected, this report is chiefly occupied with statistics, presented largely in tables and by graphs. A series of the latter, exhibiting the relation of acute conjunctivitis to seasonal temperature, is very interesting. The correspondence of

total case curve, to temperature curve by months is striking, and still more striking is the correspondence for gonococcus cases. For the Koch-Weeks cases, the curve is highest in April after the temperature minimum in February, and falls greatly to August, when the temperature is highest, and remains low to December. For the Morax-Axenfeld conjunctivitis, the curve is highest in February, falls to June and begins to rise again in November.

The place that these reports fill in ophthalmic literature is unique. Their statistics, gathered on a uniform plan, including enough cases to give them significance, covering a great country and now a period of fourteen years, throw most important light on certain points in pathology. The large operative experience here recorded should be of value in deciding the relative merit of different operative methods. Those who have to do with hospital organization and management can also find here important suggestions.

E. J.

Diseases of the Skin. A Manual for Students and Practitioners by Robert W. MacKenna, M.A., M.D., B.Ch. (Edin.) with 166 original illustrations in the text and many formulæ. Published by William Wood & Company, New York, 1923.

The reviewer does not know when he has enjoyed the reading of a medical work more than he has this new book. It is written by a Scotchman practicing in Liverpool, England, printed in Great Britain and published in New York. This shows the concordance of the English speaking peoples; the printed language and handling of the subject is very like that of American authors.

While it does not claim to be an exhaustive work, yet all the ordinary skin affections and many of the rarer conditions met with in this country and the tropics are fully described. Due attention has been paid to most of the recent advances in dermatology and the possible part played in the etiology of skin affections by anaphy-

lactic shock and sensitization by foreign proteins, as well as the subject of focal infections. In addition to skin diseases, the description of syphilis is particularly noteworthy.

A large number of skin affections affect the eyelids and sometimes the eyes themselves—ranging from lice to lepra—and ophthalmologists generally see many cases of skin disease which they may desire to refer to a dermatologist for treatment. So it behooves the head specialist to keep well up in the modern diagnosis and treatment of skin diseases. The book is beautifully printed on heavy paper and is replete with new and excellent illustrations, most of them from photographs. Methods and treatment with formulæ and a full index are included.

H. V. W.

Legal Medicine and Toxicology. Edited by **Frederick Petersen, M.D., L.L.D.**, Professor of Psychiatry in Columbia University. **Walter S. Haines, A.M., M.D.**, late Professor of Chemistry, Materia Medica and Toxicology in the University of Chicago, and **Ralph W. Webster, M.D., Ph.D.**, Professor of Medical Jurisprudence in Rush Medical College. Second Edition, in two volumes, 2,260 pages, 334 illustrations and 7 color plates. Philadelphia and London, W. B. Saunders Co.

This work has long been a standard textbook. It was originally written by specialists; and in this edition additional writers have joined in its preparation, making forty-two collaborators. It contains an immense amount of authoritative statement and well arranged information, that constitute it a great reference book on these subjects.

The chapter of most interest to ophthalmologists is the one of ten pages on "Medico-Legal Aspects of Vision and Audition" by Edward Jackson and Edward V. L. Brown. But in other parts of the work there are pages of special interest, as in the chapters on "Identification of the Living" or "Malingering and Feigned Disorders." Such chapters as those on "Legal

Rights and Obligations of Physicians," the various injuries, "The Stigmata of Degeneration," etc., have the same general interest to oculists as to other members of the medical profession. The chapters that deal with poisons, occupying most of the second volume, include full descriptions of ocular and visual symptoms.

This book will be found an important addition to any medical reference library. It deals with a wide range of subjects which nearly every practitioner, general or special, needs sometimes to study up in such an authoritative work.

E. J.

Transactions of the College of Physicians of Philadelphia, 1922. Third Series, Volume 44. Edited by **Walter G. Elmer, M.D.**, 650 pages, 49 figures in the text, and 1 plate in colors. Published by the College, Philadelphia.

In this volume the part of especial interest to ophthalmologists is the sixty-three pages devoted to the proceedings of the Section on Ophthalmology. These have already been published in this JOURNAL, either the papers being published in full, or in abstract, similar to that in this volume. Almost an equal space is devoted to the proceedings of the Section on Otolaryngology. None of the volumes of scientific transactions comes nearer to the best standard of the old proceedings of the learned societies of Europe. The appearance of this volume so soon after the year it records is a matter of congratulation to the Editor and to the College.

E. J.

CORRESPONDENCE

Professor Fuchs' Visit to Peking.

To The Editor.—The trustees of the Peking Union Medical College, upon learning that Professor Fuchs, of Vienna, intended to visit China following his tour of the United States, offered him a Visiting Professorship in Ophthalmology during his sojourn in Peking. Professor Fuchs, to the delight of the faculty of the Peking Union Medical College, accepted the



Prof. Ernst Fuchs, members of Faculty and postgraduate class in Ophthalmology at the Peking Union Medical College, Peking, China, October 23 to November 22, 1922.

invitation in spite of the fact that by so doing he would be unable to take the wonderful trip up the Yangste gorges.

An all day postgraduate course in ophthalmology for a period of one month was arranged to coincide with Professor Fuchs' visit. Professor Fuchs arrived in Peking on October 21, 1922, and during his stay was the guest of Dr. Howard. Thirty physicians coming from all over China, about half of them Chinese and the other half foreign, were enrolled in the course. Two American physicians came from Canton, a distance of over two thousand miles, and several others from the region of the Yangste river valley.

The feature of the course was the series of highly interesting lectures and demonstrations by Professor Fuchs, on the pathology of the eye, which had previously been so enthusiastically received in America. In addition Professor Fuchs gave clinical demonstrations three times a week on selected cases, which proved to be exceedingly instructive to the class and to the eye staff. The responsibility for providing instruction to the class, during that part of each day not taken by Professor Fuchs, was assumed by the members of the Ophthalmologic department of the Peking Union Medical College.

Professor Fuchs received many invitations to speak before schools and medical societies. Before the Faculty Medical Society he spoke on "The Ocular Symptoms of Tabes," and at another time on "Postgraduate Medical Teaching." He spoke before the faculty and students of the National Medical College on "Arteriosclerosis in Relation to the Eye."

On November 16 the Director and the Faculty of the Peking Union Medical College gave a banquet at the Grand Hotel de Pékin in honor of Professor Fuchs. The faculty of the National Medical College and the officers of the National Medical and Pharmaceutical Association of China acted as hosts on other occasions.

Professor Fuchs' brief visit to Peking will certainly result in increasing

the efforts to provide in China good medical teaching, especially in the field of ophthalmology, where the amount of clinical material is so large and the need for trained eye men so great. The ophthalmologists in China owe him a debt of gratitude for the inspiring service he rendered to them during his brief visit to Peking.

The importance of Professor Fuchs' visit as a historical event will be proportionate to the determination and ability of the little group of ophthalmologists in China to maintain and to perpetuate the high ideals that have been set.

HARVEY J. HOWARD.

Peking, China.

A Step Forward in College Hygiene.

To The Editor.—Having practiced Ophthalmology in a college city for over thirty years, and doing much of my work among the University students; and having watched with interest the downfalls of many during that time; I have felt the importance of the extreme eyestrain which they are obliged to overcome and endure in their advanced work. Yearly I have implored some one of the Professors to have inserted in the announcement a statement advising all students to come prepared to meet this extreme demand as far as their eyes are concerned.

Year after year I have seen the failures due to this cause, and have many times expressed myself in strong terms to different members of the faculty on this subject. Many a student has fallen down at their final examinations due to "cramming" and overwork at these times and comes for excuses. Dr. Dean F. Smiley, Dean of the Hygiene Department, only recently told me that he thought 40% of the failures were due to eyestrain. I would say about 25%. Be that as it may, surely it is too large a number. My experience is that too many ophthalmologists fail to insist upon the constant wearing of the glasses prescribed. The patients are apt to misunderstand, (most of them intentionally), and wear their glasses in their pockets, using them for study only, when their eyes are already tired for distant

vision before they commence the close work.

Only recently, I cared for Professor W. N. Barnard of Sibley College of Mechanical Engineering, who saw where-in I was right and took it upon himself to place the subject before the faculty, which has ratified the suggestion to a man. Now, from my experience with student life at Cornell, I advise every oculist to make it clear, that every college student is instructed to wear his glasses *constantly* if he expects to keep up with his work. I have seen so many failures due to this neglect.

I enclose herewith the next announcement catalogue, see page 24, which speaks for itself, and I believe it is the very first important step of its kind in any college or school announcement.

JOHN S. KIRKENDALL, M.D.

Ithaca, N. Y.

The paragraph in question reads:

"A Necessary Precaution.—Before coming to the University, the student should consult an oculist and have any defect of vision corrected. Unless he does so, he may begin his work under a disadvantage and run the risk of failure. The large amount of close work that is required in reading and drafting puts a strain on farsighted, or otherwise imperfect eyes. Such a weakness, unless discovered and remedied before the student begins his work, may delay his progress and impair his health."

The Eyesight Conservation Council.

To The Editor.—I recently received some literature from "The Eyesight Conservation Council" of New York, which interested me in my capacity as Chairman of the Conservation of Vision Committee for this state.

In looking over their pamphlets I learned that the moving spirits of the propaganda were opticians and optometrists, but that on their council were found the names of a doctor late of the A. M. A. Council, and another late of the A. M. A. Conservation of Vision Committee.

I wrote to these doctors asking for information, and wondering as to the advisability of "sitting in the game," with these venders of optical wares.

I have heard from both of these gentlemen, and learn that their attitude is rather sympathetic toward the movement: in the words of one of them: "I believe that the objects as stated in their literature are good and that we were fully justified in lending our aid. There are not enough qualified ophthalmologists in the country to care for all who need glasses, and there is a large field for the refracting optician and optometrist, providing they will confine their efforts to fitting glasses, for those who for some reason are unable to consult an ophthalmologist, and in which there is no obvious disease of the eye, and who can be given normal vision. My feeling is that we should do anything we can to help the optician and the optometrist to avoid the mistakes they have made in the past and to limit their work to what they can do safely."

I have answered this by submitting certain propositions, with the inquiry as to what program they propose to follow to remedy the evident faults now existing.

In brief, my propositions referred to the failure of the optician to recognize serious disease which may be associated with some refractive errors, even tho he might, for purposes of argument, be considered as competent to refract correctly.

His attitude regarding cycloplegia, and the innuendoes which are often thrown broadcast that "drops" often cause blindness; the fact that public health nurses so often find children with asthenopic symptoms whose parents refuse to waste any more money on their eyes because they have already tried the optician, the idea which patients get that the professional services of the competent oculist are superfluous, and that his reasonable fees for refraction are extortionate, leading often to the ludicrous reduction of refraction fees so as to compete with the optician, making a tradesman out of the doctor—such things as these, it appears to me will require the exercise of quite a bit of ingenuity, if ophthalmologists are to succeed in making the necessar-

ily commercial opticians "avoid the mistakes they have made in the past."

I have approached the subject in an openminded attitude, and am willing to be shown, if possible, that it is my duty to cooperate with this movement. I am fully aware that the propaganda of the optical houses is enormous, and that it would be a fine thing if it might

be so directed as to minimize the harm resulting from their sins of omission and commission. For this reason I would suggest that it would be desirable to discuss this matter in the American Journal of Ophthalmology.

Very truly,

J. G. PARSONS.

Sioux Falls, So. Dakota.

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. They should be sent in by the 25th of the month. The following gentlemen have consented to supply the news from their respective sections: Dr. Edmond E. Blaauw, Buffalo; Dr. H. Alexander Brown, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. Robert Fagin, Memphis; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. Geo. F. Keiper, LaFayette, Indiana; Dr. Geo. H. Kress, Los Angeles; Dr. W. H. Lowell, Boston; Dr. Pacheco Luna, Guatemala City, Central America; Dr. Wm. R. Murray, Minneapolis; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. John E. Virden, New York City; Dr. John O. McReynolds, Dallas, Texas; Dr. Edward F. Parker, Charleston, S. C.; Dr. Joseph L. McCool, Portland, Oregon; Dr. Richard C. Smith, Superior, Wis.; Dr. J. W. Kimberlin, Kansas City, Mo.; Dr. G. McD. Van Poole, Honolulu; Dr. E. B. Cayce, Nashville, Tenn.; Dr. Gaylord C. Hall, Louisville, Ky.; Dr. Edward D. LeCompte, Salt Lake City.

DEATHS.

Dr. Walter Nevin Sharp of Indianapolis, aged sixty-four years, died recently. He had been a contributor to this JOURNAL.

Dr. Lee Marion Murphy, of South Pasadena, California, aged thirty-eight, died on April eighteenth, following a long illness.

Dr. William Shields of Holdrege, Nebraska, died April twenty-fifth, following an illness of several months. Dr. Shields has been in special practice for many years, and was one of the best known oculists in his section of the state.

SOCIETIES.

For the coming year Dr. J. S. Lichtenberg was elected president, and Dr. J. W. Kimberlin treasurer of the Kansas City Academy of Medicine.

At the April meeting of the Kansas City Eye, Ear, Nose and Throat Society the following officers were elected. President, Dr. R. J. Curdy; first vice-president, Dr. J. H. Buckley; second vice president, Dr. Sam Roberts, secretary-treasurer, Dr. W. E. Keith.

The Utah Ophthalmological Society journeyed to Provo, Utah, on May twenty-first, where it was entertained before its meeting by Drs. H. G. Merrill and Oakes at a dinner at the former's home. Monthly meetings of the society will be resumed in September.

About thirty-five members of the Nebraska Academy of the Eye, Ear, Nose and Throat, met in Lincoln on May fourteenth. Dr. Harold Gifford of Omaha presented a paper on "The Present Status of Glaucoma." Dr. Sheldon Cook of Lincoln was elected president for the ensuing year, and Dr. Clarence Rubendall, of Omaha, secretary.

The last meeting of the season of the Buffalo Ophthalmological Club united its members at a dinner, when Dr. Charles B. Meding of New York City was the guest of honor. Dr. Meding read a paper on the "Better Surgery of Cataract Extraction," followed by an informal rendering of his personal impressions of Colonel Henry Smith, of British India.

At the meeting of the Section on Ophthalmology of the New York Academy of Medicine, May 21st, 1923, the paper of the evening was read by Dr. A. H. Thomasson, by invitation, "Chronic Gonorrheal Prostatitis, a Possible Etiologic Factor in Certain Inflammations of the Eye"; other papers followed by Dr. E. F. Dubois on "Modern Conceptions of Exophthalmic Goiter; and by Dr. John M. Wheeler, on "Conservative Surgery of Exophthalmos. Presentation of cases followed.

The Virginia Society of Ophthalmology and Oto-Laryngology met in Richmond, April 18. Guests of the Society were Dr. Walter Lambert of New York and Dr. H. Maxwell Langdon of Philadelphia, who spoke on Focal Infections in Relation to Eye Diseases. Dr. Lambert limited his remarks to the Sinus Conditions. Dr. Fisher of Philadelphia spoke on the Equilibrium Tests in Relation to Cerebral Localization. The officers chosen for the coming year are: President, Dr. Joseph A. White, Richmond; Vice-President, Dr. James Morrison, Lynchburg; Sec.-Treasurer, Dr. E. A. Wallenstein, Richmond.

Twenty eye, ear, nose and throat men were members of the party on the recent cruise of the American College of Surgeons to South America. They were very graciously received by the oculists and aurists in the various cities

visited, where excellent demonstrations and clinics were arranged in their honor. In addition there were frequent meetings on board ship, profitable discussions on subjects of interests to men in special work. The personnel was as follows: Dr. O. M. Babbit of Portland, Oregon; Dr. I. P. Balabanoff of Tacoma, Washington; Dr. J. F. Barnhill of Indianapolis, Indiana; Dr. R. Boulet of Montreal, Canada; Dr. F. D. Branch, of Binghamton, New York; Dr. T. W. Brophy of Chicago, Illinois; Dr. D. C. Bryant of Los Angeles, California; Dr. F. E. Burch of St. Paul, Minnesota; Dr. L. D. Chipman of St. John, N. B.; Dr. O. Dowling of New Orleans, La.; Dr. J. H. Kincaid of Knoxville, Tennessee; Dr. G. A. Leahey of Lowell, Massachusetts; Dr. J. M. Patton of Omaha, Nebraska; Dr. G. W. Schlindwein of Erie, Pa.; Dr. C. Smith of Spokane, Washington; Dr. F. M. Sulzman of Troy, New York; Dr. L. H. Taylor of Wilkes-Barre, Pa.; Dr. F. J. Van Kirk of Bellingham, Washington; Dr. W. E. Waddell of Los Angeles, California; and Dr. J. A. Winter of Duluth, Minnesota.

PERSONAL.

Dr. and Mrs. Fred Stauffer of Salt Lake spent the month of February in Honolulu.

Dr. Carl A. Hoberecht of St. Louis, Missouri, has opened an office at 626 Metropolitan Building.

Dr. Joseph W. Howard and Dr. Harold B. Hedrick are now associated at Suite 910 Rialto Building, Kansas City, Missouri.

Dr. A. Ray Irvine, for the last fifteen years in the practice of ophthalmology in Salt Lake City, will soon take up practice in Los Angeles.

Dr. H. W. Woodruff of Joliet, Ill., was a guest of honor at the Kansas State Medical Society which met in Kansas City, Kansas, in May. He gave an operative eye clinic.

Dr. Harvey D. Lamb, St. Louis, has been appointed ophthalmologist to the Missouri School for the Blind, to succeed Dr. Joseph W. Charles whose term has expired.

Dr. Robert von der Heydt, of Chicago, delivered the annual address before the Eye, Ear, Nose and Throat Section of the Ohio State Medical Society, at Dayton, on May second.

Dr. Gustavus I. Hogue of Milwaukee, Wisconsin, sailed on the *Majestic*, May twelfth, for Barcelona, Spain, there to observe and study Professor Ignacio Barraquer's Operation for Cataract.

Dr. Sanford R. Gifford and family of Omaha, Nebraska, sailed April twenty-fifth for Europe. Dr. Gifford having visited those of Paris, will spend some months working in the ophthalmologic clinics at Freiburg and Zurich.

Dr. Howard Forde Hansell, Professor of Ophthalmology of Jefferson Medical College, Philadelphia, will leave for a vacation sojourn in Europe, June eighth, and will return early in September.

Dr. Thomas Hall Shastid, of Duluth-Superior, has written a novel called "Simon of

Cyrene," which is having a considerable run. It is published in England by Messers. Wheldon and Wesley, and in America by George Wahr. The volume is dedicated to Dr. Hovde, of Superior, who is also an ophthalmologist.

Mr. Basil Graves, Lang Clinical Research Scholar (late Senior House Surgeon and Chief Clinical Assistant) Moorfields Eye Hospital, and British Medical Association Science (Ophthalmology) Research Scholar, has been appointed Pathologist and Curator of the Royal Westminster Ophthalmic Hospital, W. C.

Dr. Casey A. Wood, who is making a trip through the South Sea Islands, was last heard from at Melbourne, Australia, where he was lavishly entertained. He is still pursuing his work on birds' eyes. When he returns he should have a lot of new data on the eyes of birds that he has not had an opportunity of studying before.

A number of well-known ophthalmologists of Philadelphia desire to express their appreciation to Dr. George Cross, for his generosity in placing himself at their service in the performance of plastic operations, especially those associated with building of the eyelids. Dr. Cross' extensive army experience in this special branch of ophthalmology has been widely recognized.

Philadelphia ophthalmologists are very appreciative of the honor recently conferred upon their distinguished coworker, Dr. George E. de Schweintz, Professor of Ophthalmology in the University of Pennsylvania, in the invitation to deliver the Bowman Lecture before the Ophthalmological Society of the United Kingdom. Dr. de Schweintz recently went abroad for the purpose indicated and chose for his subject "Concerning Certain Ocular Aspects of Pituitary Body Disorders, Mainly Exclusive of the Usual Central and Peripheral Hemipic Field Defects." He has been made an Honorary member of the society before which the lecture was delivered. He returned home about May twenty-sixth.

MISCELLANEOUS.

The Kansas State Legislature has passed a bill creating a commission for the blind.

The New York Eye and Ear Infirmary was bequeathed \$10,000 by the will of Miss Grace Wilkes.

The John Dibert Memorial Building at the Eye, Ear, Nose and Throat Hospital, New Orleans, was formally opened to the public, March fifteenth.

The Public Welfare Society has just opened an ophthalmologic hospital and dispensary, which will replace the old Santa Lucia Hospital. The new institution is considered the best of its type in the world.

It is estimated that forty-thousand glass eyes are imported into the United States every year. Many thousands are manufactured in this country. The average length of service of a glass eye is six months.

Regarding the prevalence of eye defects in industrial works, one plant reports to the National Committee for the Prevention of Blindness that out of 6,142 men examined, 3,111, or approximately 51 per cent had defective vision. In the Company dispensary, 38 per cent of all the work done is eye work. Last year three eyes were lost from trauma, all three from imbedded steel.

At a meeting of the Chicago Women's Club and the Illinois Society for the Prevention of Blindness, April second, a committee was appointed to propose an amendment to the new state medical practice act that would require all midwives to have at least one year of high school training; from six months to a year of special training in midwifery; registration at the city health department, and submission to inspection of their work at any time by the health department.

The following reports from two states, is an indication of the good results being brought about by propaganda for the proper care of the eyes at the time of birth. For the past five years not one child born in Massachusetts, so far as the authorities are aware, has become blind from ophthalmia neonatorum. In an article entitled "Cleveland After Sixteen Years," published in the "Outlook for the Blind," Mrs. Eva P. Palmer, Executive Secretary of the Cleveland Society for the Blind, says that the number of blind in Cleveland

has remained stationary for twelve years while the city has doubled in size. There is no blind baby under three years of age in the city.

The following ophthalmologic appointments in Paris are announced for 1923-1924:

Hôtel-Dieu: Surgeon, Prof. de Lapersonne; Assistant, Monbrun; Chef de Clinique, Prelat; Chef de Clinique Adjoints, Gautrand; Chef de Labor, Cousin.

Hôpital de la Pitié: Monthus, Ophthalmologist (consultation); Suppléant, Chatellier; Externes, Thizy, Héry.

Hôpital Saint-Antoine: Magitot, Ophthalmologist (consultation); Suppléant, Joseph; Externes, Villetard de Prunières, Broujaniski.

Hôpital Cochin: Cantonnet, Assistant (consultation); Suppléant, Fombeure; Externes, Faure, Azam.

Hôpital Lariboisière: Morax, Ophthalmologist; Assistant, Bollack; Internes, Lagrange, Hartmann; Externes, Nida, Marteret, Isnel, Subileau, Autier.

Hôpital Laennec: Rochon-Duvigneaud, Ophthalmologist; Assistant, Giraud; Adjoint, Besnard; Interne, P. Veil; Externes, Allaire, Triboulet, Lasearde.

Hôpital des Enfants-Malades: Poulard, Ophthalmologist; Assistant, Boussi; Interne, Castéran; Externes, Kouindjy, Audigier, Devouge, Monot.

Current Literature

These are the titles of papers bearing on ophthalmology. They are given in English, some modified to indicate more clearly their subjects. They are grouped under appropriate heads, and in each group arranged alphabetically, usually by the author's name in **heavy-face type**. The abbreviations mean: (Ill.) illustrated; (Pl.) plates; (Col. Pl.) colored plates. Abst. shows it is an abstract of the original article. (Bibl.) means bibliography and (Dis.) discussion published with a paper. Under repeated titles are given additional references to papers already noticed. To secure early mention, copies of papers or reprints should be sent to American Journal of Ophthalmology, 217 Imperial Building, Denver, Colorado.

BOOKS.

- American Academy of Ophthalmology and Oto-Laryngology. Trans. 27th Annual Meeting, 1922. 608 pages, 125 illustrations. Clarence Loeb, Editor, Chicago. A. J. O., 1923, v. 6, p. 430.
- Elms, J. Nursing of diseases of eye. Simple treatise for nurses. The Scientific Press, Ltd., London, 1923. Lancet, 1923, April 21, p. 805.
- Goldnamer, W. N. Anatomy of human eye and orbit. Published by Professional Press, Chicago, 1923. A. J. O., 1923, v. 6, p. 431.
- Hygela. A journal of individual and community health. Volume 1, No. 1. 66 pages, illustrations. Published by the A. M. A., Chicago, 1923. A. J. O., 1923, v. 6, p. 432.
- Kamath, M. A. Notes on ophthalmology. 88 pages. Tanjore Medical School. Indian Med. Gaz., 1923, v. 58, p. 186.
- Lucklesch, M. Ultraviolet radiation. 258 pages, 12 plates. New York. D. Van Nostrand Co., 1922. A. J. O., 1923, v. 6, p. 430.
- Robson, F. Miners' nystagmus. South Wales Institute Engineers, Park Place, Cardiff, 1923, 97 pages. Brit. Med. Jour., March 31, 1923, p. 570.

DIAGNOSIS.

- Berens, C. A diplopia test glass. Arch. of Ophth., 1923, v. 52, p. 272.
- Fabry and Buisson. Universal photometer without diffusing screen. Rev. d'Opt. Theor. et Instrument, 1922, Jan., No. 1. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 450.
- Gallemaerts. Diagnostic localization of intra-ocular foreign bodies with Gullstrand lamp. Ann. d'Ocul., 1923, v. 160, p. 164.
- Goldstein, I. Tonometer tester. Arch. of Ophth., 1923, v. 52, p. 277.
- Hesky, M. Ophthalmoscopy by red free light, and ophthalmoscopy by white and colored lights. Boll. di Ocul., 1922, p. 135.
- Koby, F. E. Reflection of light by cornea in slit lamp microscopy. (2 ill.) Rev. Gén. d'Opht., 1922, v. 36, pp. 435-446.
- Kurtz, J. I. Malingering—pretended blindness. U. S. Naval Med. Bull., 1923, April, pp. 449-456.
- Melanowski, W. H. Ophthalmoscopy by red-free light. Polska Gaz. Lek., 1922, No. 23. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 397.
- Thorington, J. M. Mechanism and use of variable five minute test letter. (8 ill. bibl.) A. J. O., 1923, v. 6, pp. 361-366.

THERAPEUTICS.

- Berens, C. Eye dropper and container. Arch. of Ophth., 1923, v. 52, p. 272.

- Cords, R. Protein treatment in ophthalmology. Klin. Woch., 1923, v. 2, pp. 171-174.
- Darier, A. Biologic medication, vaccine therapy. Clin. Opht., 1923, v. 27, pp. 123-130.
- Gifford, S. R. Common problems on eye diseases of infancy and childhood. Nebraska State Med. Jour., 1923, v. 8, pp. 165-170.
- Hantke, H. Experience with novoprotein. Klin. M. f. Augenh., 1923, v. 70, p. 403.
- Jeandelize, P., and Bretagne, P. Ocular autoserotherapy. Médecine, 1923, v. 4, p. 278. Abst. J. A. M. A., 1923, v. 80, p. 1183.
- Joltrois. Ionization in ocular therapeutics. (2 ill.) Clin. Opht., 1923, v. 27, pp. 130-142.
- Kerbrat, Y. Action of sclerogene for sub-conjunctival injections. Ann. d'Ocul., 1923, v. 160, pp. 187-192.
- Magitot, A. Influence of collyria on hypertonic reaction of human eye after corneal puncture. (4 ill.) Ann. d'Ocul., 1923, v. 160, pp. 165-174.
- Reitsch, W. Chlorethyl in ciliary pain. Klin. M. f. Augenh., 1923, v. 70, p. 381.
- Rollet, E. Radiotherapy in ophthalmology. Jour. de Méd. de Lyon, 1923, March, pp. 151-163.
- Rosenstein, A. M. Iodin injections (mirion) in luetic eye diseases. Klin. M. f. Augenh., 1923, v. 70, pp. 373-380.
- Schanz. Ultraviolet content of light. Arch. f. Ophth., v. 103, p. 158. Abst. Arch. of Ophth., 1923, v. 52, p. 300.
- Tiffenau. Chemic and physiologic action of mydriatics and miotics. Ann. d'Ocul., 1923, v. 160, pp. 233-235.

OPERATIONS.

- Berens, C. Lid everter and retractor. Arch. of Ophth., 1923, v. 52, p. 272.
- D'Alessandro, A. Ocular grafts. Semana Med., 1923, v. 30, p. 553.
- Vernon, E. L. Butyn, a local anesthetic in ocular operations. A. J. O., 1923, v. 6, pp. 402-404.

PHYSIOLOGIC OPTICS.

- Aebly. Geometric form of corneal surface. Klin. M. f. Augenh., 1923, v. 70, p. 263.
- Brown, E. J. Subjective visual impressions. A. J. O., 1923, v. 6, p. 432.
- Diaz-Caneja, E. Visual projection. Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 209-213.
- Edridge-Green, F. W. Curious phenomena of vision and their practical importance. Med. Press, 1923, v. 115, pp. 254-258.
- Glancy, A. E. Limit of visibility in ultraviolet. (1 ill.) Amer. Jour. Phys. Optics, 1923, April, pp. 145-151.
- Graham, W. P. Absorption of eye for ultraviolet radiation. (3 ill.) Amer. Jour. Phys. Optics, 1923, April, pp. 152-162.

- Jackson, E. Subjective visual sensations, illusions. A. J. O., 1923, v. 6, p. 429.
- Mond. Influence of ultraviolet rays. Pfüger's Arch. f. d. ges. Physiol., v. 196, pp. 540-559. Klin. M. f. Augenh., 1923, v. 70, p. 251.
- Noiszewski, K. Minimum visible and minimum separable, differential and integral vision. Klinika Oczna, 1923, pp. 21-28.
- Rossi, V. Ocular physiology. Review of literature. Arch. di Ottal., 1923, v. 30, pp. 59-80.
- Streiff, J. Binocular flat images and many sided visual problems. (7 ill.) Klin. M. f. Augenh., 1923, v. 70, pp. 1-16.

REFRACTION.

- Bestor, H. M. Relation between convergence and accommodation. (4 ill.) Amer. Jour. Phys. Optics, 1923, April, pp. 228-236.
- Bussy, L. Accommodation. Mechanism and diseases. Jour. de Méd. de Lyon, 1923, March, pp. 175-183.
- Comberg. Relative binocular correction. Arch. f. Augenh., v. 87, p. 75. Abst. Arch. of Ophth., 1923, v. 52, p. 300.
- Doyle, P. G. Myopic child. Clinical Jour., 1923, v. 52, pp. 157-161.
- French, R. F. Diminishing accommodation artificially produced. (21 ill. dis.) Jour. Iowa State Med. Soc., 1923, v. 13, pp. 135-142.
- Gullstrand, A. Simultaneous determination of refraction and visual acuity. (6 ill.) Svenska Lakar. Handl., 1922, v. 48, pp. 53-102.
- Hanssen, R. Genesis of myopia. Klin. M. f. Augenh., 1923, v. 70, p. 392.
- Hantke, H. Myopia and tuberculosis. Klin. M. f. Augenh., 1923, v. 70, p. 402.
- Lipka, A. Lenticular glasses. Polska Gaz. Lek., 1922, No. 33. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 412.
- Lo Cascio, G. Astigmatism with aberration of eye. (1 pl.) Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 147-192.
- Mechanism of accommodation and intra-ocular accommodation. Ann. di Ottal. e Clin. Ocul., 1923, v. 51, pp. 193-198.
- Sheard, C. New and sensitive astigmatic test dial. (3 ill.) Amer. Jour. Phys. Optics, 1923, April, pp. 163-166.
- Fundamental points in testing and correcting astigmatism. Amer. Jour. Phys. Optics, 1923, April, p. 167.
- Presbyopia and subnormal accommodation. Amer. Jour. Phys. Optics, 1923, April, pp. 202-225.
- Silva, L. False traumatic myopia with spasm of ciliary muscle cured by atropin. Brazil Med., 1923, v. 37, p. 154.

OCULAR MOVEMENTS.

- Cords, R. Nystagmus. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, pp. 369-390.
- Diaz-Caneja, E. Stereoscopic vision. Arch. de Oft. Hisp.-Amer., 1923, v. 23, pp. 224-230.
- Duverter. Divergent strabismus after epidemic encephalitis. Arch. d'Opht., 1923, v. 40, p. 176.

- Fromaget, C. Reflections of latent congenital nystagmus. (1 ill.) Ann. d'Ocul., 1923, v. 160, pp. 175-183.
- Lutz, A. Visual motor tracts and their dissociation. (7 ill.) Klin. M. f. Augenh., 1923, v. 70, pp. 213-236.
- Marin Amat, M. Operative treatment of strabismus. Siglo Med., 1923, v. 71, pp. 97-100. Abst. Internat. Sur. Ophth., 1923, v. 5, p. 208.
- Marquez, M. Van der Hoeve's work on "The ocular muscles and strabismus." Klin. M. f. Augenh., 1923, v. 70, pp. 389-391.
- Robinson, S. H. Oculo-prism treatment. (3 ill.) Amer. Jour. Phys. Optics, 1923, April, pp. 178-195.
- Schaaf. Unilateral ophthalmoplegia in young girl. Arch. d'Opht., 1923, v. 40, p. 175.
- Schubeus, H. Bilateral abducens paralysis and choked disc after novocain. Supra-renal lumbar anesthesia. Klin. M. f. Augenh., 1923, v. 70, pp. 154-157.
- Soupault, R. Dissociation of eye centers after novocain. Presse Méd., 1923, April 25, p. 379.
- Stahman, F. C. Monocular nystagmus following muscle advancement. (dis.) A. J. O., 1923, v. 6, p. 411.
- Whitmire, A. Correction of squint. (3 ill. bibl.) Arch. of Ophth., 1923, v. 52, pp. 242-251.

CONJUNCTIVA.

- Arlot. Cytology of trachoma. (dis.) Congrès colonial d. l. santé, 1922, Sept. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 476.
- Aubaret. Prophylaxis of trachoma. (dis.) Congrès colonial d. l. santé, 1922, Sept. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 478.
- Bane, W. C., and W. M. Trachoma in negroes. Cystoid swelling of upper eyelid. (dis.) A. J. O., 1923, v. 6, p. 417.
- Bella, V. di. Blepharorrhagic ophthalmia. Pediatria, 1923, v. 31, pp. 146-151. J. A. M. A., 1923, v. 80, p. 1418.
- Branca, J. Constitution and trachoma. Klin. M. f. Augenh., 1923, v. 70, p. 393.
- Dor, L. Follicular conjunctivitis. (bibl.) Jour. de Méd. de Lyon, 1923, March, pp. 163-169.
- Dunn, J. W. Follicular eye affections in children. Ill. Med. Jour., 1923, v. 43, p. 384-388.
- Gallois, J. Encysted hemorrhage of lower conjunctival culdesac. Soc. d'Opht. de Paris, Oct., 1922. A. J. O., 1923, v. 6, p. 407.
- Kapur, D. D. Operative treatment of trachoma by excision of fornix. Indian Med. Gaz., 1923, v. 58, pp. 158-160.
- Krämer. Argentum aceticum in gonoblennorrhoea. Klin. M. f. Augenh., 1923, v. 70, p. 405.
- Lehrfeld, L. Ophthalmia neonatorum. (7 tables.) A. J. O., 1923, v. 6, pp. 380-385.
- Lindner. Membranous stratification of conjunctiva in trachoma. Ophth. Gesell. in Wien, 1923, Jan. Klin. M. f. Augenh., 1923, v. 70, p. 247.
- Oyenard, A. Method of Abadie in treatment of granular conjunctivitis. Com. del Hosp. Oftal. Buenos Aires, 1922, Dec., pp. 101-106.

- Pillat, A. Results of parenteral milk injections in gonoblennorrhoea. (bibl.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 289-318.
- Powers, G. F., Park, E. A., and Simmonds, N. Influence of radiant energy upon xerophthalmia in rats. *Jour. Biol. Chemistry*, 1923, v. 55, pp. 575-599.
- Rosnoblet. Prophylaxis and treatment of gonococcus ophthalmia of newborn. *Jour. de Méd. de Lyon*, 1923, March, pp. 183-186.
- Salterain, J. de. Tuberculosis of conjunctiva. *Arch. Latino-Amer. de Pédiat.*, 1923, v. 17, p. 26.
- Sedan, J. Therapy of trachoma at Marseille. (dis.) *Congrès colonial d. l. santé*, 1922, Sept. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 477.
- Truc. Evolution of trachoma in region of Montpellier. (dis.) *Congrès colonial d. l. santé*, 1922, Sept. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 479.
- Wootton, H. W. Pemphigus of conjunctiva. (dis.) *Arch. of Ophth.*, 1923, v. 52, p. 270.
- Repeated title. Petit. (O. L., 1921, v. 17, p. 545.) *A. J. O.*, 1923, v. 6, p. 435.
- ### CORNEA AND SCLERA.
- Adrogué, E. Arcus juvenilis. *Com. del Hosp. Oft. Buenos Aires*, 1922, Dec., pp. 147-153. *Prensa Med. Argentina*. (4 ill. bibl.) 1922, v. 9, pp. 463-466.
- Besso, M., and Dazzi, A. Etiology and pathogenesis of eczematous keratoconjunctivitis. *Boll. d'Ocul.*, v. 12, p. 569-592. *Klin. M. f. Augenh.*, 1923, v. 70, p. 261.
- Boussi and Veil. Keratoconjunctivitis cured by autovaccine, staphylococcus. (dis.) *Soc. d'Opht. de Paris*, 1922, Oct. *A. J. O.*, 1923, v. 6, p. 405.
- Forster, A. E. Keratoplastic surgery and experiments in keratoplasty. (bibl.) *A. J. O.*, 1923, v. 6, pp. 366-375.
- Frankowska, J. Galvanism in treatment of dystrophic keratitis. *Klinika Oczna*, 1923, pp. 18-20.
- Gonzalez, J. Keratoconjunctivitis. *Rev. Valisoletana Especialidades*, 1922, Sept., p. 276.
- Gullstrand, A. Keratoconus with distinct pulsation of cornea. (4 ill.) *Svenska Lakar Handl.*, 1922, v. 48, pp. 103-118.
- Hartog. Ektebin in scrofulous eye disease. *Münch. med. Woch.*, 1923, v. 70, pp. 299-300.
- Injection of alcohol into gasserian ganglion, cranial nerve paralysis and loss of eye. *Brit. Jour. Surg.*, 1923, v. 10, p. 573.
- Joel. Juvenile arcus senilis with cholesterolinemia. *Klin. M. f. Augenh.*, 1923, v. 70, p. 403.
- Killick, C. Treatment of conical cornea. (dis.) *Proc. Royal Soc. Med., Sec. on Ophth.*, 1923, Jan. *A. J. O.*, 1923, v. 6, p. 409.
- Kraupa, E. Lattice like degeneration of cornea. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 179-180.
- Family degenerative changes in cornea (neurotic dystrophy and ichthyosis). *Klin. M. f. Augenh.*, 1923, v. 70, p. 396.
- Krebs, A. Calcareous degeneration of cornea. *A. J. O.*, 1923, v. 6, p. 412.
- Lindner. Treatment of serpent ulcer after Shahan. *Ophth. Gesell. in Wien*, 1923, Jan. *Klin. M. f. Augenh.*, 1923, v. 70, p. 247.
- Maggiore. Immunity specific therapy for corneal ulcer. *Ann. di Ottal. e Clin. Ocul.*, 1923, v. 51, pp. 127-147.
- Maschler. Copper changes in cornea. *Ophth. Gesell. in Wien*, 1923, Jan. *Klin. M. f. Augenh.*, 1923, v. 70, p. 246.
- Merrill, W. H. Removal of lime deposits from cornea. *A. J. O.*, 1923, v. 6, p. 433.
- Nakamura, B. Resorption by cornea. (1 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 88-90; (4 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 90-100.
- Mori, S. Ophthalmia produced by diets containing unfavorable inorganic elements. *Amer. Jour. Hygiene*, 1923, v. 3, pp. 99-103.
- Nakamura, B. Resorption by cornea. (1 col. pl.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 195-213.
- Reitsch. Trypaflavin for corneal ulcer. *Klin. M. f. Augenh.*, 1923, v. 70, p. 401.
- Rosenstein, A. M. Symmetric corneal swelling in diabetes mellitus. (1 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 239-243.
- Sedan, J. Hypopyon keratitis with lacrimal complications and pneumococcal panophthalmia. *Ann. d'Ocul.*, 1923, v. 160, pp. 192-196.
- Simon, C. Alopecia areata in rabbit following experimental herpes of cornea with syphilis. *Bull. Soc. Franç. de Dermat. et Syphil.*, 1922, v. 29, p. 358. *Abst. Arch. Dermat. and Syphil.*, 1923, v. 7, p. 660.
- Twelmeyer, O. Pseudosclerosis with Fleischner's corneal ring. *Klin. M. f. Augenh.*, 1923, v. 70, p. 399.
- Weihmann, M. Bandage treatment of corneal ulcer from contact glass. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 236-239.
- Repeated title. Mazzei. (*A. J. O.*, 1922, v. 5, p. 164.) *A. J. O.*, 1923, v. 6, p. 436.
- ### ANTERIOR CHAMBER AND PUPIL.
- Adrogué. Cholesterol crystals in anterior chamber. *Prensa Med. Argentina*, 1923, v. 9, pp. 889-890.
- Handmann. Cholesterol in anterior chamber. *Klin. M. f. Augenh.*, 1923, v. 70, p. 395.
- Kestermann, G. Accommodative pupil reflex without light reflex. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 141-148.
- Magitot, A., and Dautrevaux. Modification of aqueous after ligation of carotid. *Soc. d'Opht. de Paris*, 1922, Oct. *A. J. O.*, 1923, v. 6, p. 407.
- Mawas, J., and Terrien, F. Histology of pupillary membrane. *Soc. d'Opht. de Paris*, 1922, Oct. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 486.
- Schwarz, O. Accommodative pupil reflex without light reflex. *Klin. M. f. Augenh.*, 1923, v. 70, p. 148.
- Shastid, T. H. Pupillary phenomena. *Amer. Jour. Phys. Optics*, 1923, April, pp. 125-145.
- Terrien, F., and Mawas, J. Histology of persistent pupillary membrane. *Soc. d'Opht. de Paris*, 1922, Oct. *A. J. O.*, 1923, v. 6, p. 406.

THE UVEAL TRACT.

- Adrogué, E. Aplasia of anterior surface of iris. *Com. del Hosp. Oft.* Buenos Aires, 1922, Dec., pp. 153-157.
- Bailliant, P. Veins on anterior surface of iris. *Soc. d'Opht. de Paris*, 1922, July. A. J. O., 1923, v. 6, p. 405.
- Ellett, E. C. Sequels of iritis. (dis.) A. J. O., 1923, v. 6, p. 442.
- Hentschel, F. Recurring hypopion iritis. *Klin. M. f. Augenh.*, 1923, v. 70, p. 402.
- Key, B. W. Unilateral chorioretinal atrophy. (dis.) *Arch. of Ophth.*, 1923, v. 52, p. 276.
- Lauber. Bilateral tubercular uveitis with retinal detachment in one eye. *Ophth. Gesell. in Wien*, 1923, Jan. *Klin. M. f. Augenh.*, 1923, v. 70, p. 246.
- Lindberg, J. G. Congenital aniridia. (3 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 133-138.
- McCaw, J. A. Advanced chorioretinal atrophy. (dis.) A. J. O., 1923, v. 6, p. 419.
- Metzger, E. L. Pigmentation of anterior layer of iris in diabetes mellitus. (bibl.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 344-346.
- Schall, E. Etiology of subchronic uveoparotitis. *Klin. M. f. Augenh.*, 1923, v. 70, p. 350.
- Stieren, E., and Shuman, G. H. Exudative choroiditis. A. J. O., 1923, v. 6, p. 411.

SYMPATHETIC DISEASE.

- Hentschel, F. Tuberculous sympathetic ophthalmia. *Klin. M. f. Augenh.*, 1923, v. 70, p. 403.

GLAUCOMA.

- Amsler, M. Tonometric observations. (2 figs.) *Rev. Gén. d'Opht.*, 1922, v. 36, pp. 387-394.
- Asmus, E. Löwenstein's double protection in Elliot's trephine hole. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 193-195.
- Aubaret. Abatement of ocular tension in glaucoma before sclerectomy. *Marseille Méd.*, 1922, No. 7. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 404.
- Böhm, F. M. Cyst formation in Descemet's membrane after cyclodialysis. (3 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 171-174.
- Charlin, C. Etiology of glaucoma and changes in vascular system with glaucomatous disease. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 123-133.
- Csapody, I. v. Intraocular tension and thyroid gland. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 111-123. *Arch. d'Opht.*, 1923, v. 40, pp. 171-174.
- Duschnitz. Juvenile glaucoma with nevus of half the face. *Klin. M. f. Augenh.*, 1923, v. 70, p. 404.
- Elliot, R. H. New sign in diagnosis of glaucoma. (21 ill.) *Jour. Ophth. Otol. and Laryngol.*, 1923, April, v. 27, pp. 118-140.
- Goldenburg, M. Iridotaxis operation for glaucoma. A. J. O., 1923, v. 6, pp. 353-356.
- Lambert, W. E. Aphakia with glaucoma. *Arch. of Ophth.*, 1923, v. 52, p. 268.
- Lauber. Prevention of malignant glaucoma. *Ophth. Gesell. in Wien*, 1923, Jan. *Klin. M. f. Augenh.*, 1923, v. 70, p. 246.
- Maglot. Ocular tension after puncture of anterior chamber and pressure of globe.

Soc. de Opht. de Paris, 1922, April. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 449.

- Experimental ocular hypotony by intravenous injection of hypertonic substance. *Soc. d'Opht. de Paris*, 1922, March. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 398.
- Noiszewski, K. Glaucoma and intracranial pressure. *Polska Gaz. Lek.*, 1922, No. 17. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 403.
- Reitsch. Recurring hemorrhage into anterior chamber after cyclodialysis. *Klin. M. f. Augenh.*, 1923, v. 70, p. 401.
- Seefelder. Hydrophthalmos due to developmental anomaly. *Arch. f. Ophth.*, v. 103, p. 1. *Abst. Arch. of Ophth.*, 1923, v. 52, p. 296.
- Snell, A. C. Hereditary glaucoma simplex. *New York State Jour. Med.*, 1923, v. 23, pp. 151-155.
- Wiltchke, H. Fistulization scar after iridectomy, anterior sclerotomy and Elliot's trephining. *Klin. M. f. Augenh.*, 1923, v. 70, p. 402.
- Yoshida, Y. Acute glaucoma following Heine's cyclodialysis. (bibl.) A. J. O., 1923, v. 6, pp. 356-360.
- Repeated title. *Russl.* (A. J. O., 1922, v. 5, p. 165.) A. J. O., 1923, v. 6, p. 435.

THE CRYSTALLINE LENS.

- Bär, C. Copper opacity of lens. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 174-176.
- Denti, A. V. Accident during cataract operation. *Gior. di Ocul.*, 1922, v. 3, p. 134. *Abst. Internat. Med. and Surg. Survey*, 1922, v. 4 (8a-575).
- Ezell, H. Bilateral cataract extraction. (dis.) A. J. O., 1923, v. 6, p. 420.
- Fabritius, A. Discission with linear extraction of soft cataract. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 387-388.
- Ganguly, S. K. Complications after some cataract operations. *Calcutta Med. Jour.*, 1922, v. 17, pp. 249-262.
- Ginestous and Piechaud. Cataract and synchysis scintillans. *Jour. de Méd. de Bordeaux*. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 505.
- Gonzalez, J. Spontaneous rupture of Morgagnian cataract. *Rev. Vallisoletana de Especialidades*, 1922, Nov., p. 335.
- Gullstrand, A. Posterior lenticulus. *Svenska Lakar. Handl.*, 1922, v. 48, pp. 119-124.
- Hagen, S. Cataract extraction in Norway. *Norsk. Mag. for Lagevid.*, 1923, v. 84, p. 193.
- Kubik, J. Separation of zonular layers in glass blowers' cataract. (1 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 327-330.
- Lister, A. E. J. Intracapsular extraction of cataract. *Brit. Med. Jour.*, 1923, April 7, p. 612.
- Lagrange. Senile cataract. *Médecine*, 1923, v. 4, p. 247. *Abst. J. A. M. A.*, 1923, v. 80, p. 1183.
- Löwenstein. Origin of congenital opacities of lens. *Arch. f. Ophth.*, v. 103, p. 37. *Abst. Arch. of Ophth.*, 1923, v. 52, pp. 295 and 297.
- Maddox, E. E. Intracapsular extraction of cataract. *Brit. Med. Jour.*, 1923, April 21, p. 699.

- Rogers, R. M. Sequel of cataract extraction. *A. J. O.*, 1923, v. 6, p. 423.
- Santa Cecilia. Spontaneous cure of Morgagnian cataract. *Brazil Med.*, 1923, v. 37, p. 184.
- Scheerer, R. Congenital vascular cataract with visible blood stream. (bibl.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 337-343.
- Schnyder, W. F. Morphology of diabetic cataract. (6 ill. 1 table.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 45-78.
- Siemens. Etiology of ectopia lentis and pupil. *Arch. f. Ophth.*, v. 103, p. 59. *Abst. Arch. of Ophth.*, 1923, v. 52, p. 296.
- Wirth. Cataract in glass blowers. *J. A. M. A.*, 1923, v. 80, p. 1163.
- Wolff, J. Cataract containing foreign body. (dis.) *Arch. of Ophth.*, 1923, v. 52, p. 274.

THE VITREOUS HUMOR.

- Aust. Vascular loop in vitreous. *Ophth. Gesell. in Wien*, 1923, Jan. *Klin. M. f. Augenh.*, 1923, v. 70, p. 247.
- Ellett, E. C. Sequels of vitreous hemorrhages. *A. J. O.*, 1923, v. 6, p. 422.
- Goldstein, I. Hole in hyaloid membrane. *Arch. of Ophth.*, 1923, v. 52, p. 271.
- Rae, L. Hole in hyaloid. (dis.) *Proc. Royal Soc. Med., Sec. on Ophth.*, 1923, Jan. *A. J. O.*, 1923, v. 6, p. 408.
- Spanyol, V. Healing by withdrawal of vitreous in spontaneous vitreous hemorrhage. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 383-386.

THE RETINA.

- Behan, J. L. Fundus in toxemias of pregnancy. *New York State Jour. Med.*, 1923, v. 23, pp. 140-143.
- Bittorf. Aortic insufficiency and dimness of vision with pulsation. *Klin. M. f. Augenh.*, 1923, v. 70, p. 399.
- Cameron, A. T., and O'Donoghue, C. H. Retinal reflexes of narcotized animals to sudden changes of intensity of illumination. *Biol. Bull. Marine Biol. Lab.*, 1922, v. 42, pp. 217-233. *Abst. Zent. f. d. ges. Ophth. u. i. Grenz.*, 1923, v. 9, p. 399.
- Cattaneo, D. Changes in ganglion cells of retina with optic nerve lesions. *Boll. Soc. Med. Clin. Pavia*, 1922, v. 34, p. 270. *Klin. M. f. Augenh.*, 1923, v. 70, p. 268.
- Chaillous, J. Anomalous detachment of retina in infant. *Soc. d'Opht. de Paris*, 1922, June. *Abst. Rev. Gén. d'Opht.*, 1923, v. 36, p. 458.
- Cohen, M. Recent hole at macula. *Arch. of Ophth.*, 1923, v. 52, p. 271.
- Connell, R. E. W. Blackwater fever complicated by retinal hemorrhage. *Jour. Trop. Med. Hyg.*, 1922, v. 25, p. 378. *Abst. Zent. f. d. ges. Ophth. u. i. Grenz.*, 1923, v. 9, p. 355.
- Coppez, H., and Danis, M. Senile macular exudative retinitis. (2 col. pl. 38 ill.) *Arch. d'Opht.*, 1923, v. 40, pp. 129-159.
- Delorme. Myopic detachment of retina cured by colmatage of anterior segment. (2 ill.) *Arch. d'Opht.*, 1923, v. 40, pp. 166-170.
- Dodd, R. C. Exudative retinitis. Coates' disease. (dis.) *Arch. of Ophth.*, 1923, v. 52, p. 269.

- Hine, M. Maculocerebral degeneration. (dis.) *Proc. Royal Soc. Med., Sec. on Ophth.*, 1923, Jan. *A. J. O.*, 1923, v. 6, p. 408.
- Kroh, O. Fatigue of retinal rods. *Zeit. f. Phys. S.*, v. 53, p. 187. *Klin. M. f. Augenh.*, 1923, v. 70, p. 250.
- Lambert, W. E. Detachment of retina. (dis.) *Arch. of Ophth.*, 1923, v. 52, p. 267.
- Lampis, E. Entoptic phenomena. *Arch. di Ottal.*, 1923, v. 30, pp. 80-95.
- Levy, A. Amaurotic family idiocy. (dis.) *Proc. Royal Soc. Med., Sec. on Ophth.*, 1923, Jan. *A. J. O.*, 1923, v. 6, p. 408.
- Noiszewski, K. Treatment of retinal detachment with modified diet. *Klinika Oczna*, 1923, pp. 1-5.
- Onfray, R. Preretinal hemorrhages in pregnancy. *Soc. d'Opht. de Paris*, 1922, July. *A. J. O.*, 1923, v. 6, p. 405.
- Rae, L. Neuroretinitis with detachment of retina. *Proc. Royal Soc. Med., Sec. on Ophth.*, 1923, Jan. *A. J. O.*, 1923, v. 6, p. 409.
- Soriano, F. J. Myelin fibers of macular region. *Com. del. Hosp. Oft. Buenos Aires*, 1922, Dec., pp. 106-110.
- Szmaj, S. Etiology of exudative and proliferating retinitis. *Klinika Oczna*, 1923, pp. 10-18.
- Valentine, J. A. Retinitis pigmentosa sine pigmento. (dis.) *Proc. Royal Soc. Med. Sec. on Ophth.*, 1923, Jan. *A. J. O.*, 1923, v. 6, p. 408.
- Wood, H. Thrombosis of central retinal vein. (1 col. pl.) *A. J. O.*, 1923, v. 6, pp. 400-401 and 421.

TOXIC AMBLYOPIAS.

- Abelsdorf. Optic nerve disease from optochin. *Klin. M. f. Augenh.*, 1923, v. 70, p. 403.
- Forster, A. E. Pathogenesis of quinin amblyopia. (bibl.) *A. J. O.*, 1923, v. 6, pp. 376-380; 236.
- Sattler, C. H. Increase of tobacco-alcohol amblyopia after the war. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 318-325.
- Bromural and adalin poisoning of eyes. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 149-152.

THE OPTIC NERVE.

- Boehmig. Diagnosis of tabetic optic nerve atrophy. *Klin. M. f. Augenh.*, 1923, v. 70, p. 397.
- Canuyt. Unilateral optic neuritis. *Arch. d'Opht.*, 1923, v. 40, p. 177.
- Filinski, W., and Melanowski, W. Blindness following hemorrhage of stomach. *Klinika Oczna*, 1923, pp. 8-10.
- Gross, J. H. Hiccough followed by loss of vision. *A. J. O.*, 1923, v. 6, p. 402.
- Guillery, H. Carcinoma and lymph flow in optic nerve (Behr). *Klin. M. f. Augenh.*, 1923, v. 70, p. 391.
- Janku, J. Tubercle of optic disc and choroid. *Casopis Lekar. Cesk.*, 1923, v. 62, p. 93. *Abst. J. A. M. A.*, 1923, v. 80, p. 1279.
- Jost. Optic nerve atrophy with orbital injury. *Arch. d'Opht.*, 1923, v. 40, p. 177.

Loebner, H. Choked disc with uremia. *Klin. M. f. Augenh.*, 1923, v. 70, p. 400.

Moreau. Papillary stasis in decompressive craniectomy. *Loire Méd.*, 1923, Jan. Abst. *Clin. Opht.*, 1923, v. 27, p. 167.

Robertson. Retrobulbar neuritis following salvarsan. (dis.) *A. J. O.*, 1923, v. 6, p. 415.

Rosenbaum, M. Connective tissue mass of optic nerve. (dis.) *Arch. of Ophth.*, 1923, v. 52, p. 275.

Shields, J. M. Optic atrophy after fall. (dis.) *A. J. O.*, 1923, v. 6, p. 419.

Simon, C., and Bralez, J. Acute optic neuritis, fatal meningomyelitis and acute meningitis in course of treatment with bismuth. *Bull. Soc. Franç. de Dermat. et Syph.*, 1922, v. 29, p. 354. Abst. *Arch. of Dermat. and Syphil.*, 1923, v. 7, p. 659.

Strum, S. A. Unilateral exophthalmus with optic neuritis. (dis.) *A. J. O.*, 1923, v. 6, p. 411.

Uthoff. Changes in optic nerve in arteriosclerosis. *Klin. M. f. Augenh.*, 1923, v. 70, p. 399.

Disturbance of vision after loss of blood. *Klin. M. f. Augenh.*, 1923, v. 70, p. 399.

Velter and Liebault. Cure of acute retrobulbar neuritis from sinus disease. (4 fields.) *Arch. d'Opht.*, 1923, v. 40, pp. 159-165.

VISUAL TRACTS AND CENTERS.

Backhaus, M. Encephalography for differential diagnosis in internal hydrocephalus with metastasis after intraocular tumor. (4 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 330-335.

Banister, J. M. Fugacious homonymous hemianopsia. (bibl.) *A. J. O.*, 1923, v. 6, pp. 396-400.

Beck, O., and Pillat, A. Visual fields in empyema of nasal sinuses. (1 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 78-88.

Fröhlich, F. W. Scintillating scotoma in visual field. *Niederrh. G. f. Natur. u. Heilk.*, 1921, Jan. 17. Abst. *Arch. of Ophth.*, 1923, v. 52, p. 298.

Lauber. Bilateral scintillating scotoma with escape of macular region. *Klin. M. f. Augenh.*, 1923, v. 70, p. 405.

Lenz. Serial sections in hypophysis tumors. *Klin. M. f. Augenh.*, 1923, v. 70, p. 398.

Lowry, B. W. Adenoma of hypophysis. (dis.) *A. J. O.*, 1923, v. 6, pp. 412-414.

Muskens, L. J. J. Central connections of vestibular nuclei with corpus striatum; their significance for ocular movements and locomotion. *Brain*, 1922, v. 45, pp. 454-479.

Rhoads, J. N. Functional chromoperiodic hemianopsia. (2 ill.) *A. J. O.*, 1923, v. 6, pp. 392-396.

Uthoff, W. Binasal hemianopsia. (1 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 138-141.

Williamson, R. T. Recognition of hemianopsia in general practice. *Practitioner*, 1923, v. 110, pp. 276-283.

COLOR VISION.

Boehmig. Disturbance of central color sense after bodily effort. *Klin. M. f. Augenh.*, 1923, v. 70, p. 397.

Morax, V., and Bollack, J. Temporal hemiachromatopsia. *Soc. d'Opht. de Paris*, 1922, July. *A. J. O.*, 1923, v. 6, p. 405.

Polack, A. Accommodative compensation of ocular colorization. Inefficiency of d'Alembert's theory. *Gaz. des Hôp.*, 1923, v. 96, p. 482.

Shields, M. C. Visibility function and visibility thresholds for color defectives. (4 ill.) *Amer. Jour. Phys. Optics*, 1923, April, p. 236.

THE EYEBALL.

Folinea, G. Embryology and anatomy of eye. Review of literature. *Arch. di Ottal.*, 1923, v. 30, pp. 1-25.

Mann, I. C. Congenital anomalies of eye and confusion with acquired conditions. *Lancet*, 1923, April 14, pp. 743-746 and 760.

Novak. Malformations. *Wiener ophth. Ges.*, 1920, June. Abst. *Arch. of Ophth.*, 1923, v. 52, p. 295.

Rollet and Bussy. Enucleation in panophthalmia. *Médecine*, 1923, v. 4, p. 259. Abst. *J. A. M. A.*, 1923, v. 80, p. 1183.

Schickelanz, K. Congenital anomalies. *Klin. M. f. Augenh.*, 1923, v. 70, p. 401.

Selle, G. Inclusion of metal globe after evisceration. (1 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 176-179.

Stock, W. Metastatic ophthalmia from tubercle bacilli. (3 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 356-360.

Twelmeyer, O. Metastatic ophthalmia. *Klin. M. f. Augenh.*, 1923, v. 70, p. 400.

Weiss. Lymphatic circulation in eyes. *Med. Klin.*, 1923, p. 97. Abst. *Klin. M. f. Augenh.*, 1923, v. 70, p. 257.

Wolff, J. Fat implantation nine years after operation. (dis.) *Arch. of Ophth.*, 1923, v. 52, p. 273.

Repeated title. *Cosmettatos*. (O. L., 1921, v. 17, p. 417.) *A. J. O.*, 1923, v. 6, p. 435.

THE LACRIMAL APPARATUS.

Jacquín. Trachoma and lacrimal sac. (dis.) *Congrès colonial d. l. santé*, 1922, Sept. Abst. *Rev. Gén. d'Opht.*, 1922, v. 36, p. 477.

Speciale-Cirincione. Nasal and conjunctival bacteria in dacryorhinostomia. *Ann. di Ottal. e Clin. Ocul.*, 1923, v. 51, pp. 103-118.

Reitsch, W. Narcosis for operation on lacrimal canal. *Klin. M. f. Augenh.*, 1923, v. 70, p. 382.

DISEASES OF THE LIDS.

Adams, C. J. Associated movements of upper lid and jaw. *A. J. O.*, 1923, v. 6, p. 401.

Aitoff. Inoculation of anthrax by mucous conjunctiva. *Ann. d. l'Institut. Pasteur.*, 1922, p. 567. Abst. *Rev. Gén. d'Opht.*, 1922, v. 36, p. 537.

Asuncion. Ptosis. (5 ill.) *Arch. de Oft. Hisp.-Amer.*, 1923, v. 23, pp. 213-223.

- Bollack, J. Associated movements of upper lid and jaw. Soc. d'Opht. de Paris, 1922, Oct. A. J. O., 1923, v. 6, p. 406.
- Bretagne, P. Partial tarsorrhaphy for spasmodic entropion of lower lid. Ann. d'Ocul., 1923, v. 160, pp. 196-199.
- Cange, A. Surgical treatment of entropion. Médecine, 1923, v. 4, p. 261. Abst. J. A. M. A., 1923, v. 80, p. 1183.
- Ellett, E. C. Cicatricial ectropion. A. J. O., 1923, v. 6, p. 422.
- McCaw, J. A. Ulcerative destruction of lids and eyeball. (dis.) A. J. O., 1923, v. 6, p. 419.
- Nocito, J. P. Hyperkeratosis of tarsus. Com. del Hosp. Oft. Buenos Aires, 1922, Dec., pp. 143-147.
- Masselin. Unilateral postoperative Claud Bernard-Horner syndrome. Arch. d'Opht., 1923, v. 40, p. 175.
- Posey, W. C. Alopecia and poliosis of eyelids. J. A. M. A., 1923, v. 80, pp. 1204-1207.
- Szily, A. v. Operative treatment of distichiasis. (8 ill.) Klin. M. f. Augenh., 1923, v. 70, pp. 16-45.
- Szymanski, J. Tarsectomy combined with Kuhnt-Heisrath-McCallan treatment of trachoma. Klinika Oczna, 1923, pp. 5-8.

DISEASES OF THE ORBIT.

- Cheney, R. C. Orbital abscess. (2 ill. bibl.) Arch. of Ophth., 1923, v. 52, pp. 252-258.
- Gallemaerts. Furuncle of face and orbital thrombophlebitis. Médecine, 1923, v. 4, p. 255. Abst. J. A. M. A., 1923, v. 80, p. 1183.
- Houser, K. M. Unilateral exophthalmos. Surgical Clinics North America, 1923, v. 3, p. 281.
- Layera, J. Orbital complications of sinus disease. Com. de Hosp. Oft. Buenos Aires, 1922, Dec., pp. 110-142.
- Reitsch. Serious hemorrhage after incision for orbital phlegmon. Klin. M. f. Augenh., 1923, v. 70, p. 401.
- Salterain, J. de, and Munyo, J. C. Maxillary sinusitis and abscess in orbit. Arch. Latino-Amer. de Pediat., 1923, v. 17, p. 22. Abst. J. A. M. A., 1923, v. 80, p. 1184.
- Santa Cecilia, J. Pulsating exophthalmos. Brazil Med., 1923, v. 1, pp. 4-6. Abst. J. A. M. A., 1923, v. 80, p. 1347.

INJURIES.

- Altschul, W. Localization of intraocular foreign body. Fortsch. a. d. Geb. a. Röntgenstr., 1922, v. 29, pp. 441-464. Zent. f. d. ges. Ophth. u. i. Grenz., 1923, v. 9, p. 405.
- Braun, G., and Haurowitz, F. Lime erosion of cornea. (4 ill.) Klin. M. f. Augenh., 1923, v. 70, pp. 157-166.
- Gallemaerts. Magnetometer, (Model of Chanaud). (1 ill.) Ann. d'Ocul., 1923, v. 160, pp. 161-164.
- Hauptvogel, J. Injury to cornea from fish hook. (1 ill.) Klin. M. f. Augenh., 1923, v. 70, pp. 170-171.
- Lefort. Wounds of war with deep lesions of eye and integrity of globe. Maroc. Med., 1922, March 15. Abst. Rev. Gén. d'Opht., 1922, v. 36, p. 461.
- Lloyd, R. I. Magnet extraction of foreign body. A. J. O., 1923, v. 6, p. 423.
- Loebner, H. Small shot injuries with hemianopsia and visual field defects. Klin. M. f. Augenh., 1923, v. 70, p. 400.
- Matson, W. F. Incised wound thru ciliary body. (dis.) A. J. O., 1923, v. 6, p. 417.
- McDannald, C. E. Traumatic rupture of choroid. Arch. of Ophth., 1923, v. 52, p. 275.
- Morax, V. Large unsuspected foreign body in ethmoid and orbit. (dis.) Soc. d'Opht. de Paris, 1922, Oct. A. J. O., 1923, v. 6, p. 406.
- Pfuhl. Radiography of soft parts for small intraocular foreign bodies. Klin. M. f. Augenh., 1923, v. 70, p. 398.
- Quint, C. Diagnosis of intraocular steel splinter. Klin. M. f. Augenh., 1923, v. 70, p. 192.
- Reese, W. S. Rebounding intraocular foreign body. A. J. O., 1923, v. 6, p. 401.
- Rochat, G. F. Injury to cornea from sulphur-etched hydrogen. Klin. M. f. Augenh., 1923, v. 70, pp. 152-154.
- St. Martin, de. Avulsion of eye and optic nerve in right. Temporal hemianopsia left. Ann. d'Ocul., 1923, v. 160, pp. 183-187.
- Santa Cecilia. Electric injuries to eyes. Brazil Med., 1923, v. 37, p. 183.
- Schenck, H. D. Ammonium chlorid in lime injuries of eye. A. J. O., 1923, v. 6, p. 424.
- Stanford, J. B. Conjunctival flap for perforating wound of eye. A. J. O., 1923, p. 423.
- Strader, G. L. Ocular lesions from crush of head. (dis.) A. J. O., 1923, v. 6, p. 416.

TUMORS.

- Cosmettatos, G. F. Primary sarcoma of optic nerve. Rev. Gén. d'Opht., 1923, v. 37, pp. 5-14.
- Di Marzio. Supraciliary orbitotomy for orbital tumor. (2 pl. bibl.) Ann. di Ottal e Clin. Ocul., 1923, v. 51, pp. 118-127.
- Engelking, E. Symmetric tuberculoma of orbit. (3 ill.) Klin. M. f. Augenh., 1923, v. 70, pp. 100-111.
- Erggelet, H. Scleral metastasis from anastomosis of anterior ciliary vessels. (1 ill.) Klin. M. f. Augenh., 1923, v. 70, pp. 166-170.
- Fink, E. B. Fibrosarcoma of orbit. A. J. O., 1923, v. 6, p. 415.
- Garay-Annopoulos, G. Tumor of optic nerve. Ann. d'Ocul., 1923, v. 160, pp. 199-200.
- Kreiker, A. Benign tumor of orbital cavity. (3 ill.) Klin. M. f. Augenh., 1923, v. 70, pp. 371-372.
- Martin, P., and Cushing, H. Primary gliomas of chiasm and optic nerves in intracranial portion. (41 ill.) Arch. of Ophth., 1923, v. 52, pp. 209-241.
- Mawas, M. J. Retinocytoma. (Glioma of retina.) Soc. d'Opht. de Paris, 1922, Oct. A. J. O., 1923, v. 6, p. 407.
- Remky, E. Spontaneous cyst of posterior surface of iris and ciliary body (pseudomelanosarcoma). Klin. M. f. Augenh., 1923, v. 70, pp. 347-350.
- Shields, J. M. Iris tumor. (dis.) A. J. O., 1923, v. 6, p. 418.

- Trotteroli, G.** Pigmented neocyst of bulbar conjunctiva. *Glor. di Ocul.*, 1922, p. 1. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 453.
- Twelmeyer, O.** Origin of connective tissue in primary orbital tumor. (3 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 360-370.

GENERAL AND EXTRAOCULAR DISEASES.

- Bardsley, P.** Polycythemia with visual defects. *Proc. Royal Soc. Med., Sec. on Ophth.*, 1923, Jan. A. J. O., 1923, v. 6, p. 408.
- Cameron, W. G.** Eye symptoms in encephalitis lethargica. A. J. O., 1923, v. 6, pp. 389-392.
- Cayce, E. B.** Ocular complications of sinusitis. A. J. O., 1923, v. 6, p. 421.
- Ceni, C.** Visual power and sexual characteristics. *Zent. f. d. ges. Ophth. u. i. Grenz.*, 1923, v. 9, p. 391.
- Clapp, C. A.** Tuberculosis of eye and treatment. (bibl.) *Amer. Rev. Tuberculosis*, 1923, v. 7, pp. 81-88.
- Dunn, P.** Toxemic aspect of ocular disease. *New York Med. Jour.*, 1923, v. 117, pp. 457-458.
- Echelbarger, J. R.** Symptoms of eye diseases. Relation to general medicine. *Ohio State Med. Jour.*, 1923, v. 19, pp. 331-333.
- Fernando, A. S.** Eye in beri-beri. A. J. O., 1923, v. 6, pp. 385-388.
- Finnoff, W. C.** Nature of tuberculosis of eye. (10 ill.) *Amer. Rev. of Tuberculosis*, 1923, v. 7, pp. 67-81.
- Frenkel, H.** Palpation in ophthalmology. *Médecine*, 1923, v. 4, p. 267. *Abst. J. A. M. A.*, 1923, v. 80, p. 1183.
- Genet, L.** Ocular symptoms of lethargic encephalitis. *Jour. de Méd. de Lyon*, 1923, March, pp. 169-175.
- Gill, W. W.** Eye pathology of dental origin. *Virginia Med. Monthly*, 1923, v. 50, pp. 48-51.
- Gratiot, H. B.** Routine Wassermann test in ophthalmology. *Jour. Iowa State Med. Soc.*, 1923, v. 13, pp. 186-191.
- Hantke, H.** Early syphilis of lids. (1 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 185-187.
- Heuer, G. J.** Traumatic asphyxia. Special reference to ocular and visual disturbances. *Surgery, Gynec. and Obst.*, 1923, v. 36, pp. 686-697.
- Kahn, W. W.** Asthenopic reflex manifestations between eyes and teeth. (9 ill.) *J. A. M. A.*, 1923, v. 80, pp. 1135-1138.
- Krull, C. A.** Radiography of ocular tuberculosis. *Nederl. Tijdsch. v. Geneesk.*, 1923, v. 1, pp. 630-642. *J. A. M. A.*, 1923, v. 80, p. 1279.
- Lange.** Oral, conjunctival and nasal infection of guinea pigs with tubercle bacillus. *Deut. med. Woch.*, 1923, v. 49, pp. 343-345.
- Maltese, G.** Oculocardiac reflex in diseases of eyes. *Glor. di Ocul.*, 1921, p. 131. *Abst. Rev. Gén. d'Ocul.*, 1922, v. 36, p. 422.
- Monthus, A.** Ocular accidents in spinal anesthesia. *Médecine*, 1923, v. 4, p. 273. *Abst. J. A. M. A.*, 1923, v. 80, p. 1183.

Monthus and Drécourt. Ocular lesions after spinal anesthesia. *Soc. d'Opht. de Paris*, 1922, July. A. J. O., 1923, v. 6, p. 405.

Morel, C., and St. Martin, R. de. Ocular manifestations in epidemic of botulism. *Presse Méd.*, 1922, p. 829. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 511.

Novak, E. Therapy of eczematous eye disease. *Klin. M. f. Augenh.*, 1923, v. 70, p. 405.

Reganati, F. Orbital and ocular complications of frontal sinusitis. *Glor. di Ocul.*, 1923, v. 4, p. 14. *Abst. Internat. Sur. Ophth.*, 1923, v. 5, p. 197.

Saint-Martin, de. Ocular syndrome of botulism. *Médecine*, 1923, v. 4, p. 274. *Abst. J. A. M. A.*, 1923, v. 80, p. 1183.

Simchowicz, T. Nasophthalmic and nasosubmental reflex. *Polska Gaz. Lek.*, 1922, No. 39. *Abst. Rev. Gén. d'Opht.*, 1923, v. 37, p. 17.

Sondermann, G. Ocular disturbance from congenital ichthyosis. (3 ill.) *Klin. M. f. Augenh.*, 1923, v. 70, pp. 180-185.

Terrien, F. Ophthalmic migraine. *Médecine*, 1923, v. 4, p. 265.

Viton, J. J. Diagnostic tuberculin. *Com. del Hosp. Oft. Buenos Aires*, 1922, Dec., pp. 3-46.

Woods, A. C., and Dunn, J. R. Etiology of optic neuropathies. *J. A. M. A.*, 1923, v. 80, pp. 1113-1117.

Repeated title. **Söderbergh.** (A. J. O., 1923, v. 6, p. 159.) *Rev. Gén. d'Opht.*, 1922, v. 36, p. 466.

COMPARATIVE OPHTHALMOLOGY.

Böhm, E. Pupil reaction in horses with light stimulation. *Leipzig inaug. diss.*

Campos, E. Ocular surgery in horses. *Brazil Med.*, 1923, v. 37, p. 185.

Rettinger, W. Changes in optic nerve and lamina cribrosa in periodic ocular inflammation of horses. *Leipzig inaug. diss.*, 1921.

Sauter, L. L. Tunica vasculosa in periodic ocular inflammation of horses. *Leipzig inaug. diss.*, 1921.

Smith, F. Accessory organs of eye of horse. *Jour. Anat.*, 1922, v. 56, pp. 366-389.

VISUAL HYGIENE AND PROPHYLAXIS.

Farrar, F. A. Lengthening daylight. Day by means of paint and interior decoration. *Modern Hosp.*, 1923, v. 20, p. 495.

Lighting of post offices. *J. A. M. A.*, 1923, v. 80, p. 1171.

Myashita, L. Importance of prophylaxis in ophthalmology. *Nippon. Gank. Zasshi*, 1921, July. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 474.

Stange. Protective glasses. *Klin. M. f. Augenh.*, 1923, v. 70, p. 404.

Stitelet. Trachomatous soldiers of Marseilles during the war and after. (dis.) *Congrès colonial d. l. santé*, 1922, Sept. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 475.

Truc, H. Progressive decrease of trachoma in Montpellier. *Médecine*, 1923, v. 4, p. 253.

OPHTHALMIC SOCIOLOGY.

- Bab, W.** War blind in Germany and in other countries. *Klin. M. f. Augenh.*, 1923, v. 70, pp. 187-192.
- Baliña, P. L.** Resumé of diseases in ophthalmic hospital, Buenos Aires. *Com. del Hosp. Oft.* Buenos Aires, 1922, Dec., pp. 46-101.
- Berens, C., and Sturges, G. E.** Case records in ophthalmological clinics. (bibl.) *Arch. of Ophth.*, 1923, v. 52, pp. 259-265 and 272.
- Cantonnet and Nouet.** Writing for blind with usual characters. *Médecine*, 1923, v. 4, p. 254. *Abst. J. A. M. A.*, 1923, v. 80, pp. 1183.
- Control of trachoma.** *J. A. M. A.*, 1923, v. 80, pp. 1147-1148.
- Examination of blind pension applicants under 1923 Missouri Law.** *Jour. Missouri State Med. Assn.*, 1923, v. 20, p. 176.
- Mehl, W.** Percentage loss of vision in compensation cases. *Med. Rev. of Rev.*, 1922, Dec.
- Oculists' names in commercial directories.** *A. J. O.*, 1923, v. 6, p. 416.
- Phillips, O. S.** Control of trachoma. *J. A. M. A.*, 1923, v. 80, p. 1332.
- Wassing, H.** Trachoma statistics. *Wien. klin. Woch.*, 1923, v. 36, p. 229.
- Young, H. B.** Control of trachoma. *J. A. M. A.*, 1923, v. 80, p. 1332.
Repeated title. **Angelucci.** (*A. J. O.*, 1922, v. 5, p. 856.) *A. J. O.*, 1923, v. 6, p. 436.

EDUCATION, HISTORY AND INSTITUTIONS.

- Fialho, A.** Address before Rio de Janeiro Ophthalmological Society. *Brazil Med.*, 1922, v. 36, pp. 129-131.
- Finnoff, W. C.** Courses in Vienna. *A. J. O.*, 1923, v. 6, p. 427.
- Hagen, S.** Ophthalmology in Norway. *Norsk. Mag. for Lægevid.*, 1923, v. 84, pp. 193-211. *Abst. J. A. M. A.*, 1923, v. 80, p. 1350.
- Jackson, E.** Graduate teaching of ophthalmology. *A. J. O.*, 1923, v. 6, p. 425.
- McLean, W.** Working with Dr. Barraquer in Barcelona. (dis.) *A. J. O.*, 1923, v. 6, p. 423.
- Reis, W.** Epidemic of trachoma in Polish Army in 1830. *Polska Gaz. Lek.*, 1922, No. 23. *Abst. Rev. Gén. d'Opht.*, 1922, v. 36, p. 402.
- Suker, G. F.** Medical ophthalmology. *A. J. O.*, 1923, v. 6, p. 412.
- Zimmermann, C.** Clinical ophthalmology in Paris, Zurich and Munich. *A. J. O.*, 1922, v. 6, p. 426.